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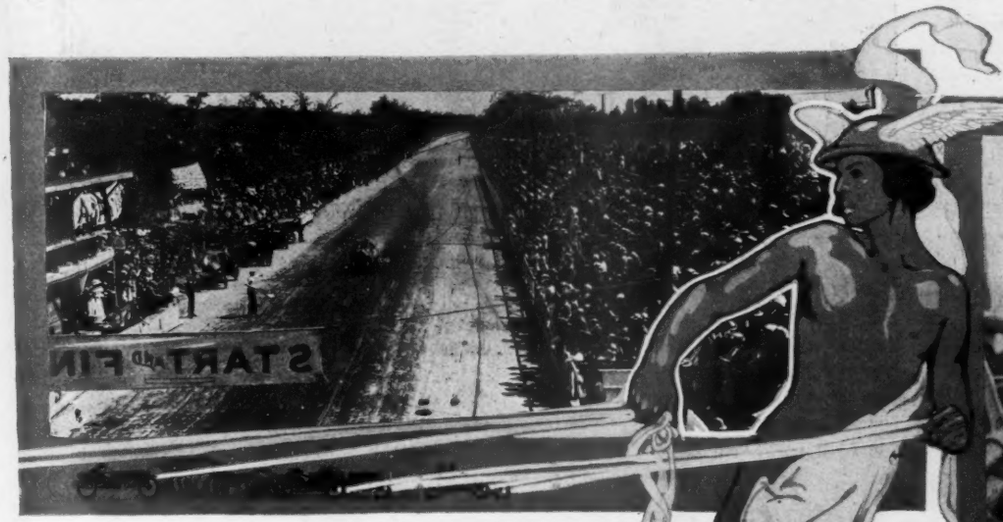
MOTOR AGE

LOWELL MOTOR CARNIVAL A RACING SUCCESS



VIEW OF HOME STRETCH

ROBERTSON, WINNING SIMPLEX DRIVER

LOWELL, Mass., Sept. 8—Special telegram—The 3-day national motor racing carnival has been one of the greatest successes of the season with its three-class road race on Monday, its speed trials Tuesday and its 318-mile race today for the Lowell trophy. The entry list was not as big and varied as desired, but in the majority of cases the cars entered were tuned up to the minute and the pilots men of great racing experience and renown, including such American stars as George Robertson, Herbert Lytle, Louis Chevrolet, Robert Burman, Lewis Strang and a host of others, including Matson, Grant, Basle, Oldfield and other lesser lights, whose driving prowess has not been so largely exploited but who have proven themselves to be foemen worthy of their steel.

The honors have been well scattered. On Monday the Buicks had a field day, winning two of the three events, with the third taken into the Chalmers camp. On Tuesday, at the speed trials, Oldfield carried off the laurel wreath with his big Benz, doing the mile in 39.9 seconds, but honors also went to Lytle in his Apperson, who did the mile in 44.4 seconds, and Chevrolet in the Buick, who did it in 49.9 seconds, these being the really fast times of the day.

Today has been the premier one, and the 20,000 crowd waited until the last of the 318-mile race to see George Robertson a winner in his big Simplex at a 54.2-mile an hour clip, with Poole in the Isotta, second; Parker in a Fiat, third, and Burman in a Buick, fourth; Basle in the Renault, fifth, all to finish, and with two Knoxes, an American and a Lozier still running.

The guarding of the course today was much better than that of yesterday, the crowds being kept entirely off the long, well-oiled boulevard stretches as well as off the back stretch.

Today's race over the Merrimack valley course of 10.52 miles has proven to be one of the greatest of its kind ever run in America. The 318 miles was an admirable distance and Robertson, the winner, covering this distance in 352:01 2/5, set an average pace of 54.2 miles per hour. Never before has a road race raised the hopes of the crowds to the possibilities of certain cars winning to see those hopes dashed to the ground within a lap after the idol had reached the climax. This situation occurred in lap 8, when Lytle took the lead only to go out of the race three laps later, and it occurred a second time when

WINNERS OF LOWELL RACES

National stock chassis race, distance 318 miles—Robertson, Simplex; time, 5:52:01 2-5.

Vesper Club trophy race, distance 212 miles—Burman, Buick; time, 3:49:08.

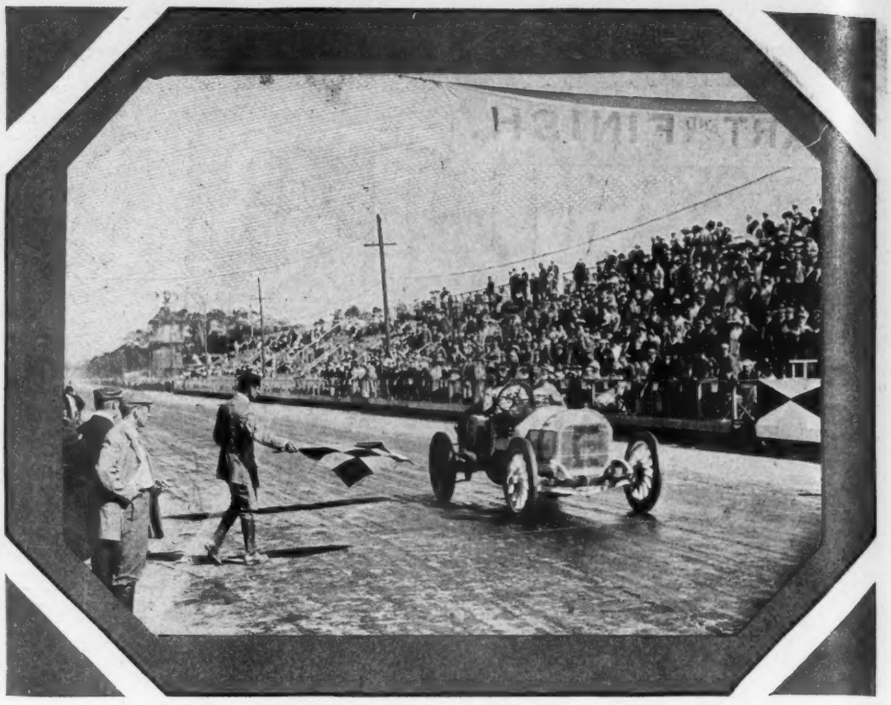
Yorick Club trophy race, distance 150 miles—Chevrolet, Buick; time, 2:56:17.

Merrimack Valley trophy race, distance 127.2 mile—Knipper, Chalmers-Detroit; time, 2:28:43.

de Palma, after fighting for a dozen laps to get into second and possibly first place, was but a matter of a few seconds from second place when he went down with troubles. The third and last occurrence of this nature came in the twenty-eighth lap, when Grant in his six-cylinder Alco, after running second to Robertson for seventeen laps, jumped into first place and went out of the race before the next lap was half way through. The race also was characterized by the numerous keen contests back in fifth and sixth places for the leadership. Of the seventeen cars that started, five were allowed to finish, eight dropped out and four, namely two Knoxes, Lozier and American, were running at the finish.

On all 3 days nothing better in the nature of weather could have been desired. The crowds today were big all around the course, and although the grandstand, capable of accommodating 9,000, was not more than two-thirds full, a great many of those standing back of the high wire fences on each side of the boulevard paid 25 cents for the privilege of standing there. It is not expected that the Lowell club will clear expenses. The city of Lowell donated $10,000 towards the defraying of expenses and the club was responsible for the remainder. The entry fees have been a considerable source of revenue, but this is small in comparison with the large melon that the American Automobile Association bargained for, and the expense of bringing outside help to look after the races, as well as the many cash prizes given to drivers.

The novelty of the first day's races was the starting of three separate events over the same course at the same time, the cars all lining up as if starting on the same race, and being sent off at 20-second intervals. The short race of 127.2 miles, or twelve laps, was for the Merrimack valley trophy and was open to stock chassis of 161 to 230 cubic inches piston displacement. Knipper, in a Chalmers, won it in 148:43. Maxwells were second and third.



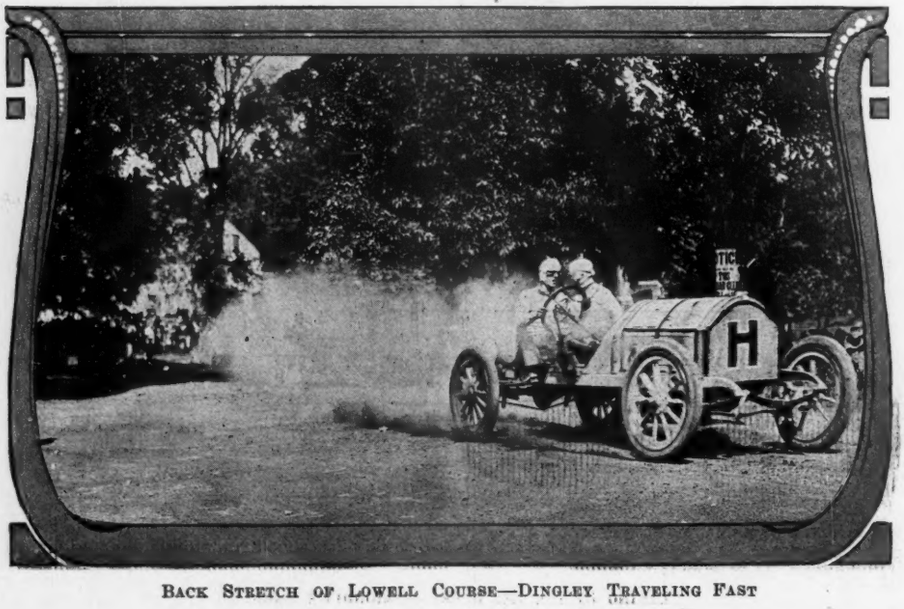
RACE SCENE MONDAY—BENZ FINISHING

The second class in this race was for stock chassis 231 to 300 cubic inches, for 159 miles, and was won by Chevrolet in a model 16A special chassis. His time was 176:17. Of the six cars to start in this race only two finished, where of the nine in the Merrimack race to start, seven finished.

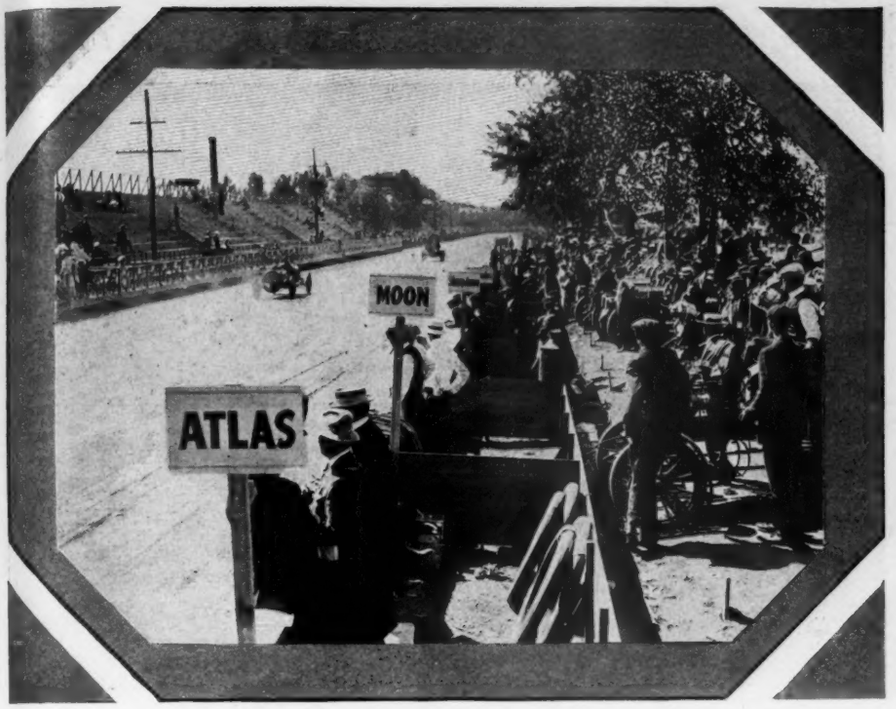
In the third race, for cars of 300 to 450 cubic inches piston displacement, 212 miles, Burman, in a Buick, won in 229:08. The phenomenal feature of the entire meet was the running of Lorimer in a 40-horsepower Chalmers-Detroit in this race, which ran without a stop until the start of the eighteenth lap, when he halted for gasoline and water but neglected taking oil. On the back stretch a piston seized and broke his cylinders. At this time he had covered 180.2 miles in 182 minutes and 26 seconds, which was 5 minutes better than Robertson made today in the big car race with cars from 450 to 600 cubic inches piston displacement. Lorimer's race was one of the greatest, if not the greatest, ever seen in America with a car of this horsepower.

The conduct of the meet was not up to the standard of a national stock chassis event. To start with, post entries were taken in every event up until the night before the start of the race, and this did not give the technical committee an opportunity to establish beyond a question of doubt the stock status of the cars. As it was, this committee, consisting of D. Beecroft, F. E. Edwards and A. L. McMurtry, required each contestant to take a cylinder off, which was micrometered and stamped. The car frames were also stamped and measurements made of wheelbases, frames, gears of gearset and other parts of the car. Each entrant was required to make affidavit to a score or more of questions as to the specifications of the car. The stock car definition required a company to have built twenty-five of the cars if they were 1909 models, and if 1910 models, parts for twenty-five must be on hand. Owing to the lateness of the entries it was impossible for the committee to visit the factories and inspect the twenty-five stock parts, and so the affidavit had to be relied upon.

As a result, a protest followed today's race, E. Rand Hollander, of the Fiat Automobile Co., New York, protesting the winning Simplex on the ground that it carried a couple of oil pipes to the back driving chains and used two gasoline feed pipes from the gasoline tank to the carbureter. The Simplex company had, previous to the race, made affidavit that it



BACK STRETCH OF LOWELL COURSE—DINGLEY TRAVELING FAST



LOOKING FROM THE PITS ON MONDAY

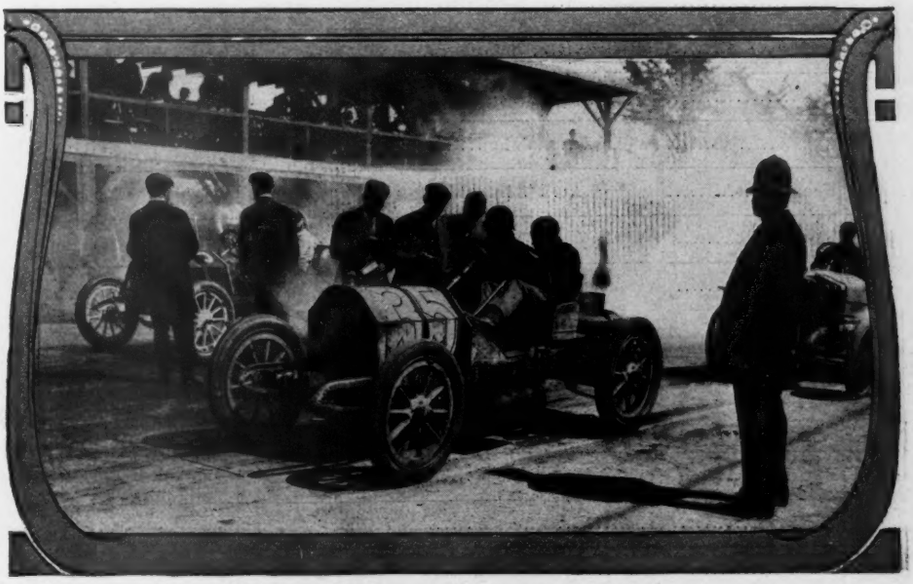
has twenty-five of this model so fitted and sold. It is reported this evening that the Isotta company also has protested. The matter is at present up for consideration before the contest board of the A. A. A.

The referee of the meet was F. B. Hower, chairman of the contest board of the A. A. A., who was assisted by Messrs. Webb, Stevens and Wright, of that board. Fred Wagner acted as starter, with Messrs. McShane and Broadwell as assistants. The timing was done on Monday and Wednesday by the Boston Chronograph Club under the direction of J. C. Kerrison and H. Knights, and in the Tuesday speed trials Messrs. Baker, Warner and Trego were in charge. J. O. Heinze, of the Lowell club, who has been responsible for Lowell securing the meet, looked after the general arrangements, assisted by the Lowell club.

In general the preference of the cars in the four road races was far above the average. In all, forty cars started, and of these, twenty-four were running at the finish. This is 60 per cent, so that only 40 per cent dropped out. It is interesting to note why they fell out. In today's race Apperson stripped a timing gear, Stoddard broke an axle, Knox broke a steering gear, Buick broke a frame, another Buick had a radiator and magneto troubles, the Alco broke a driving chain, the Allen-Kingston broke a wheel, and the Fiat trouble is not known. On Monday a model 10 Buick broke a rear wheel, and another had rear axle trouble, both being in the small race. In the middle-class race the Columbia broke a steering knuckle, the Moon had a stopped gasoline feed pipe, the Atlas threw its rims, and the Mercedes broke an oiler shaft. In the big race Monday Lorimer burst his cylinders and broke the crankcase, and a Knox wrecked a wheel.

The Lowell course, locally known as the Merrimack Valley course, is one of the strangest yet used in this country for a road race because it resembles a monster crinkled-up earthworm and is not a triangle, square or rectangle, as is so often the case with road courses. The Merrimack Valley course, as its name suggests, is in the valley of the Merrimack river. The course hugs the river on one side and the opposite side of the course is just on the rising land ¼ mile back. The course along the river bank is a boulevard, built many years ago for horse trotting sport, and is known as the boulevard stretch, in contrast with the back road known as the back stretch. At one end the boulevard and back stretch are united by the hairpin turn, around which the cars had to slow down to 15 or 20 miles per hour. The other end is called Dunbar avenue and is ½ mile in length, with street car tracks along the center of it for half the distance. The total distance around is 10.527 miles. On the boulevard side only 4 miles are really boulevard, this stretch being nearly 100 feet wide and suitable for half a dozen cars to race abreast. This stretches past the grand stand, giving all an excellent view of the course and making the grand stand more interesting because the majority of the fast cars passed the slower ones on this stretch, where the sport could be seen by all. The other half of the boulevard side is a state highroad of good macadam but little wider than an ordinary macadam road. The back stretch is a common sandy dirt road with stone fences on each side and two or three fairly stiff short climbs and plenty of turns. Half of this back stretch was oiled and was in excellent shape; the other half had not been oiled and was rough and cut up into bad ridges in places. On this back stretch are two features of the course, the S turn in a wooded stretch and the dip. The dip is a 37-foot drop in less than 50 yards and with a turn in it and an embankment.

The Lowell course is anything but a straight one, in that there are thirty turns in the 10 miles of roadway. The only straight bit is the 4-mile boulevard stretch. The remainder is constantly winding, although many of the curves can be taken without shutting off or even releasing the clutch. At half a dozen points it is not a couple of hundred yards between the boulevard side and the back stretch. The grand stand spectators can see with ease the crowds lining the back stretch opposite as well as get glimpses of the machines as they flit between the trees and crowds. When traveling on the boulevard stretch in places if you look up a rocky hillside you can see the back stretch fences.



LINING UP FOR THE START OF MONDAY'S RACES

LAP BY LAP STORY OF WEDNESDAY'S RACE

NATIONAL STOCK CHASSIS RACE

Driver and Car.	Time.
1—Robertson, Simplex.....	5:52:01 2-5
2—Poole, Isotta.....	6:13:37 1-5
3—Parker, Fiat	6:22:21 2-5
4—Burman, Buick.....	6:25:44
5—Basle, Renault.....	6:36:47 2-5

GEORGE ROBERTSON IN THE SIMPLEX, WINNER OF NATIONAL STOCK CHASSIS RACE

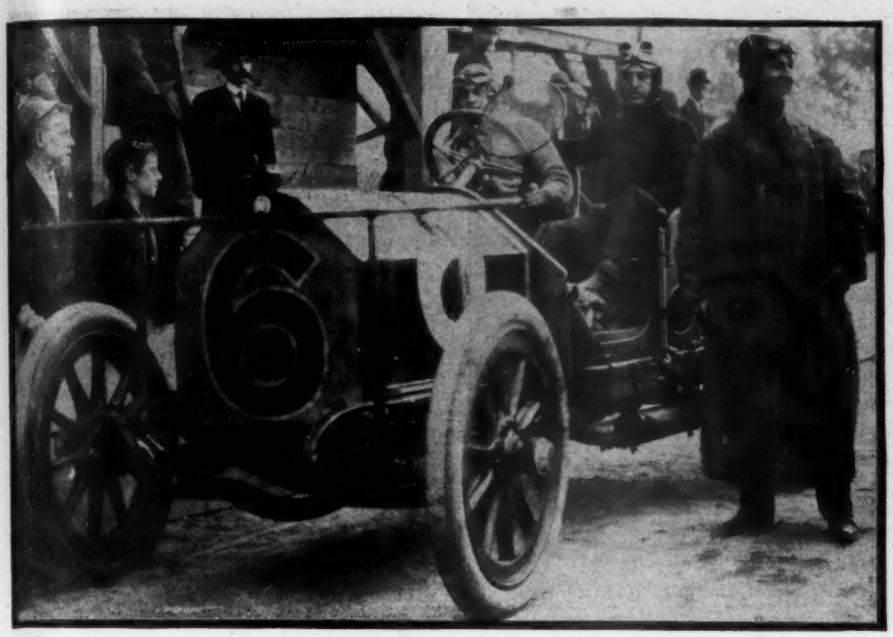
Lap 1—After a beautiful start at 30 second intervals, beginning promptly at 10 o'clock, Burman, in No. 17, Buick, jumped into the lead, having the experience of Monday's race on the track condition. He finished the lap with a 6-second lead over No. 2, American, both dark horses. No. 5, Alco, ran a tie lap with Robertson in the Simplex in 10:53, with Lytle but 4 seconds longer in the lap. It was clearly apparent that several of the experienced drivers took this lap carefully to get familiar with the speed possibilities of the turns. Scarcely had No. 20, Renault, been counted off at the start and the officials moved off the track when "car coming" aroused everybody, the 10-mile course not leaving much breathing time. The American, first off, was first to pass, and before it was beyond the grandstand two more, Burman and the Allen-Kingston, came into the stretch, Barman leading by 50 yards, having passed the Allen-Kingston. A quarter of a mile back came Grant in the Alco, and following which was a gap of 1 minute 30 seconds with no cars. Soon a well spaced string, led by Parker's Fiat, passed no more than 50 yards apart.

Lap 2—The changing of positions began early in this lap, Burman being relegated to fourth place by Chevrolet, Robertson and Lytle, Chevrolet rising to first place by doing the 10.527-mile circuit in 10:33. This lap brought George Robertson with his Simplex into second place in a gallant speed duel between him and Lytle, Robertson's time for the lap being 10:29,

LAP BY LAP STORY OF THE STOCK CHASSIS ROAD RACE, WITH MECHANICAL FEATURES OF

No.	Car	Driver	Mechanic	Weight	Bore	Stroke	Volume Cu. Inch	1	2	3	4	5	6	7	8	9
1	Buick.....	Strang	Larsnauer...	2405	4.5	5	318.	92:10	103:17 11:07	114:36 11:19	127:50 13:14	139:02 11:12	150:20 11:18	162:17 11:57	196:16 33:59	207:5 11:1
2	American.....	Drach.....	Kachline....	2985	5.75	5.5	571.32	10:47	56:44 45:57	68:57 12:13	81:21 12:24	93:29 12:08	105:38 12:09	118:03 12:25	130:25 12:22	142:4 12:1
3	Allen-Kingston.....	Hughes.....	Dustin.....	3115	5.5	6	570.24	11:39	23:10 11:31	35:13 12:03	49:44 14:31	61:46 12:02	74:04 12:18	85:46 11:42	97:42 11:56	143:3 45:5
4	Buick—16B.....	Burman.....	Grennon.....	2440	4.5	5	318.	11:05	21:55 10:50	32:38 10:43	43:33 10:55	54:34 11:01	72:38 18:04	85:38 13:00	99:58 14:20	110:4 10:4
5	Alco.....	Grant	Lee.....	2975	120	140	Cy 578.16	10:53	22:06 11:13	32:56 10:50	43:49 10:53	54:47 10:58	65:46 10:59	76:42 10:56	87:38 10:56	98:4 11:0
6	Isotta.....	Poole.....	Anderson....	2805	5.71	4.72	483.12	11:47	23:20 11:33	34:44 11:24	45:56 11:12	56:50 10:54	67:44 10:54	78:55 11:11	90:09 11:14	101:2 11:1
7	Fiat.....	Parker.....	Scudellaly..	2895	5.1	5.6	457.3	11:38	23:04 11:26	34:25 11:21	45:38 11:13	56:52 11:14	68:03 12:11	79:18 11:15	90:29 11:11	101:4 11:1
8	Knox.....	Belcher.....	Jahn.....	2370	5.	4.75	373.16	11:30	22:41 11:11	33:58 11:17	45:16 11:18	56:49 11:33	75:45 18:56	.....	.....	.....
10	Knox.....	R. Shaw.....	Winton.....	2355	5.	4.75	373.16	12:34	24:18 11:44	36:15 11:57	57:01 20:46	68:47 11:46	80:23 11:36	92:02 11:39	103:46 11:14	115:1 11:1
11	Fiat.....	De Palma.....	Pozzo.....	2760	5.6	5.1	487.	11:01	22:16 11:15	33:18 11:02	48:29 15:11	61:39 13:10	72:51 11:12	83:50 10:59	94:42 10:44	107:2 12:1
12	Simplex.....	Robertson....	Ethridge....	3095	5.75	5.75	397.32	10:53	21:32 10:39	32:19 10:47	42:58 10:39	53:34 10:36	64:30 10:56	75:33 11:03	86:35 11:02	97:3 11:0
14	Knox.....	Downey.....	Feinberg....	2780	5.5	5.5	522.72	12:23	24:36 12:13	37:13 12:37	53:50 16:37	76:52 23:02	94:51 17:59	109:04 14:13	127:41 18:37	139:3 11:5
15	Stoddard.....	Shaw.....	Hart.....	2595	5.25	5.75	497.06	12:15	24:22 12:07	36:00 11:38	47:29 11:29	58:57 11:28	70:32 11:35	81:55 11:23	93:20 11:25	104:5 11:3
16	Apperson.....	Lytle.....	Bates.....	2730	5.75	5.75	397.32	10:57	21:50 10:53	32:36 10:41	43:12 10:41	53:56 10:44	64:44 10:48	75:41 10:57	86:26 10:45	97:3 10:3
17	Buick—16B.....	Chevrolet	Nelson	2440	4.5	5	318.	10:41	21:14 10:33	35:17 14:03	.....	.....	.....	.....	.....	.....
18	Lozier six.....	Cobe.....	Horan.....	3415	4.625	5.5	554.4	11:36	23:13 11:37	35:04 11:51	46:47 11:43	58:40 11:53	70:42 12:02	110:27 39:45	125:42 15:15	140:1 23:2
20	Renault.....	Basle.....	Demand.....	2740	5.2-5	5.3-5	451.56	12:03	23:57 11:54	35:57 12:00	47:55 11:58	59:52 11:57	71:52 12:00	83:46 11:54	100:02 16:16	113:3 13:3

the fastest so far. Lytle was but 18 seconds back of him, with a lap in 10:33.



AL POOLE IN ISOTTA, WHICH FINISHED IN SECOND PLACE

The Robertson-Lytle duel in this lap was no less interesting than that of the Alco and de Palma's Fiat, the two running but 10 seconds apart. Poole in his Isotta, by two laps in 23:20, was setting a safe pace. The Allen-Kingston and Lozier were fighting for ninth place, the former with a 3-second lead. All three Knoxes were running regularly. The first trouble of the race was No. 2, American, breaking its left steering knuckle on the back stretch. The car did not leave the road and the mechanic ran to the pit and took one out of another car parked there. This gave him a very slow lap in 58 minutes and put him away to the rear. This was a Robertson lap, it was very clearly evident.

Lap 3—At this point Robertson jumped into first place, doing the lap in 10:42, but was hotly pursued by Lytle in his Apperson, who made the lap in 10:41, but was 12 seconds behind the Simplex. Burman in No. 4, by wonderful speed, was back in third position in spite of a slow lap of 12:43, but he was running just ahead of Grant in No. 5 six-cylinder Alco, which was gaining steadily, making the lap in 10:50, very little slower than Robertson and Lytle. After this point came the opening of a big three-cornered Robertson-Lytle-Grant fight, with Burman a formidable fourth. Chevrolet was out with a broken frame, the right member giving way at the right front near the radiator. Back of the four leaders came de Palma, who was gaining although running 40 to 50 seconds to the lap slower. Belcher in a Knox was close company. Parker's Fiat was showing good form, doing the lap in 11:21. Poole was on equal terms with him, Poole doing the circuit in 11:21. The Lozier was running steadily, as was the Renault, doing a 12-minute lap. The Stoddard, Allen-Kingston and Downey's and Shaw's Knoxes brought up the rear.

Lap 4—Robertson still led, doing the distance in 10:44, just 2 seconds slower than the preceding lap, while Lytle pushed the Apperson 3 seconds better, making the mark 10:41, so that Robertson held first place by but 14 seconds, his time total

ARS AND NAMES OF DRIVERS AND MECHANICS, WHICH WAS WON BY ROBERTSON IN A SIMPLEX

10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
347:03 10:28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
354:45 12:03	168:33 13:48	180:43 12:10	193:52 13:09	215:09 21:17	227:38 12:29	241:09 13:31	253:48 12:39	267:50 14:02	291:44 23:54	316:21 24:37	332:34 16:13	345:42 13 03	356:06 10:24	373:42 17:36	387:25 13:43	407:56 20:31	.....	.....	.....	.....
372:37 20:02	185:09 12:32	197:28 12:19	209:50 12:22	222:10 12:20	234:22 12:12	246:34 12:12	265:13 18:39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
385:10 17:24	148:11 11:01	159:24 11:13	170:34 11:10	181:44 11:10	192:49 11:05	203:55 11:06	215:16 11:21	227:38 12:22	238:58 11:20	250:32 11:34	262:02 11:30	273:25 11:23	284:39 11:14	305:50 21:11	317:21 11:31	330:22 13:01	351:08 20:46	362:44 11:36	374:12 11:28	385:44 11:32
398:48 13:08	122:45 12:57	133:49 11:04	144:59 11:10	158.01 13:02	171:24 13:23	182:47 11:23	194:01 11:14	205:20 11:19	219:48 14:28	231:01 11:13	242:19 11:18	253:28 11:09	264:54 11:26	276:12 11:18	287:32 11:20	298:45 11:13	309:58 11:13	Turned Over	.....	.....
413:11 11:45	124:19 11:08	136:02 11:43	149:14 13:12	171:57 22:43	184:56 12:59	197:00 12:04	209:13 12:13	221:13 12:00	233:09 11:56	244:40 11:31	256:32 11:52	268:12 11:40	284:05 15:53	296:03 11:58	308:07 12:04	325:08 17:01	337:25 12:17	349:34 12:09	361:44 12:10	373:37½ 11:53½
422:58 11:16	124:22 11:24	135:46 11:24	175:56 40:10	187:47 11:51	199:39 11:52	211:41 12:02	223:45 12:04	235:50 12:05	249:51 14:01	262:05 12:14	274:13 12:08	286:18 12:05	298:25 12:07	310:31 12:06	322:32 12:01	334:33 12:01	346:30 11:67	358:09 11:39	368:29 10:20	382:21⅝ 13:52⅝
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418:48 11:25	131:15 12:27	142:18 11:03	153:00 10:42	164:28 11:28	175:45 11:17	186:40 10:55	197:35 10:55	208:46 11:11	219:51 11:05	231:11 11:20	244:27 13:16	255:43 11:16	266:59 11:16	283:27 16:28	296:18 12:51	307:28 11:10	318:45 11:17	332:13 13:28	354:26 22:13	.....
430:36 11:01	119:38 11:02	130:56 11:18	142:10 11:14	153:26 11:16	164:51 11:25	176:19 11:28	187:55 11:36	199:36 11:41	211:15 11:39	223:09 11:54	241:18 18:09	252:33 11:15	264:02 11:29	275:25 11:23	286:37 11:12	297:58 11:21	313:22 15:24	324:48 11:26	340:09 15:21	352:01⅝ 11:52⅝
454:20 16:47	190:01 33:41	202:06 12:05	214:43 12:37	227:05 12:22	239:38 12:33	252:27 12:49	265:01 12:34	277:37 12:36	290:09 12:32	303:18 13:09	326:21 23:03	338:00 11:39	349:53 11:53	361:55 12:02	374:24 12:29	387:05 12:41	.....	.....	.....	.....
466:30 11:38	Out	Broken	axle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
470:26 12:21	Out	Stripp	ed can	shaft g	ea	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
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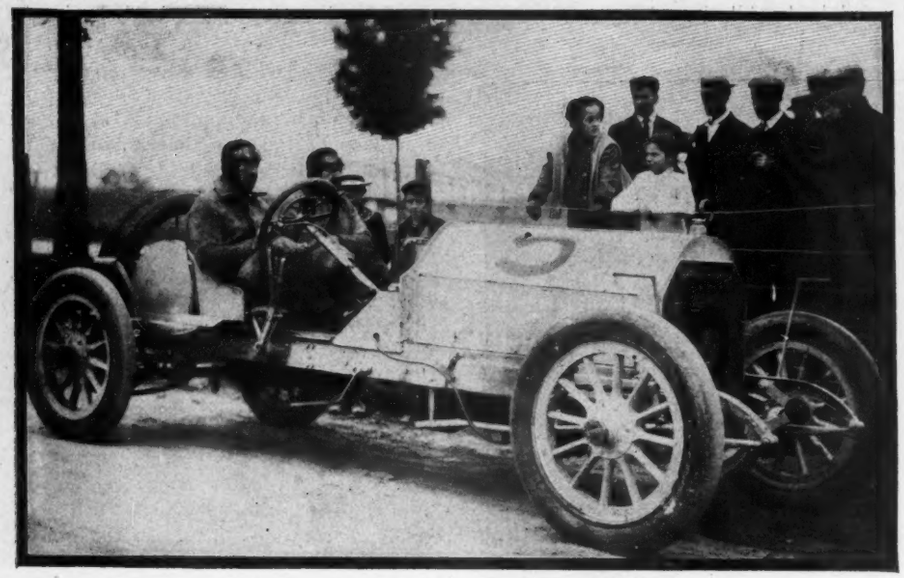
485:38 10:50	141:31 15:58	155:22 13:51	170:08 14:46	182:20 12:12	194:33 12:13	210:16 15:43	224:03 13:47	236:14 12:11	248:26 12:12	260:38 12:12	279:01 18:23	292:52 13:51	305:26 12:34	322:08 16:42	335:42 13:34	348:00 12:18	360:17 12:17	372:32 12:15	384:43 12:11	396:47⅞ 12:04⅞



GRANT IN ALCO THAT FOUGHT HARD FOR VICTORY

being 42:58 to 43:12 for Lytle. It was Robertson one, Lytle two, with Burman still third, doing the lap in 11 minutes flat. But Grant was after him, only 16 seconds away. No. 6, Isotta, was seventh. The Fiat and No. 8, Knox, were fighting a grand fifth-place battle at this time, with Belcher leading with a total of 45:16, Parker close after in 45:38, and Poole behind in 45:56. De Palma had to stop to take on a spare tire, he having had a puncture on the back stretch, which gave him 15:11 for the lap and placed him 6 minutes behind the leaders.

Lap 5—This was another Robertson-Lytle lap, with Robertson having the advantage, having gained 8 seconds on Lytle, and with a total lead of 22 seconds, both cars having averaged practically 60 miles per hour up to this point. Burman was hanging to third place with only 43 seconds between him and Grant's Alco, which was running with dependable regularity. This quartet still maintained a good lead on the rest of the field, being more than 2 minutes in advance of Belcher, Poole and Parker, who still were struggling to see which would lead, Belcher being 3 seconds ahead of Poole and Poole being but 2 seconds up on Parker. The total time of each for the five laps was: Belcher, 56:49; Poole, 56:50, and Parker, 56:52. This was one of the few laps during the race in which there was not a stop made in front of the pits by any of the contestants. A couple of minutes back came what might be called the third division runners, consisting of Shaw's Knox, another Shaw in the Stoddard, and the Lozier, this last being the fastest, in 58:40, with 58:47 for the Knox and 58:57 for the Stoddard. De Palma was late, being delayed with tire troubles. The Renault was continuing its program of making laps around the 12-minute mark, its record showing 12:03, 11:54, 12 flat, 11:58 and 11:57 up to this period.

Lap 6—This proved an eventful circuit to not a few of the contestants. It closed with Robertson still leading Lytle by the narrow margin of 14 seconds, but Burman had lost third place, Grant having at last landed his Alco in this good position to strike for second and perhaps first place. Burman had trouble with his clutch, having to stop at the end of the lap and oil it. Grant at this juncture became a most important factor in the race, although running more than a minute to the lap slower that either Robertson or Lytle. With Burman away back, requiring 18:04 for the lap, Poole brought the Isotta up into fourth from fifth. Parker, but 19 seconds behind him, took fifth place, Belcher in his Knox having fallen out of the Poole-Parker-Belcher contest of the race. He required 18:56 for the lap. The Burman-Belcher difficulties gave an opportunity to some of the other under ones to get up to the firing line, and the Stoddard and Lozier responded, the Stoddard having but 10 seconds the better of the Lozier in the run for sixth place, both running 6 minutes back of Robertson and Lytle. At this juncture Strang, who started very late, and the American, because of its broken steering spindle, were running nearly 50 minutes back of the leaders. The Renault maintained its reputation by going another lap in 12 seconds flat.

Lap 7—This lap saw Lytle and Robertson run a dead heat, each negotiating the distance in 10:57, leaving Robertson still in the lead, with a margin of a few seconds. Lytle had his Apperson in good form and passed the grand stand at over 80 miles per hour. Grant now became the object of interest, in that he made the lap in 1 second less than Robertson and Lytle and so gained on his attack on first place. His running was attracting the grandstand every lap. Poole held fourth place, with Parker fifth, the former gaining 4 seconds faster on the round. Burman made another stop at his pit to repair his clutch, putting sand into it to prevent slipping, and replenishing with oil at the same time, losing thereby 2 minutes. His making the lap in 13 flat may have had something to do with this. He was back in eighth place, 10 minutes behind the leaders. Back of the Parker-Poole duel came the Stoddard in sixth, and the Renault had climbed into seventh place, the Lozier, occupying this post in the sixth having to stop at the pits for 3 minutes to change four spark plugs and look after a leaky gasket. The Renault made the lap in 11:22, the fastest for it so far. This one lap saw the dropping out of Belcher with his No. 8 Knox, which broke a steering knuckle pivot arm when making a turn on the back stretch. Belcher was cutting the turn wide at the start in order to get close at the center of it, but when he turned the wheel the part gave way and the car continued straight ahead. Both sets of brakes were slammed on and the car brought to a standstill in not more than 60 feet, with nobody hurt. A few minutes later Belcher was back in the

DRACH IN AMERICAN ROADSTER

Knox pit at the grandstand. Strang in the Buick and Drach in the American were making laps in 13 and 12 minutes, but were a long ways back. Shaw in No. 10, Knox, did the lap in 11:39, which was about his regular running average, excepting lap 4, which was very fast, in 10:46, or at a 60-mile clip.

Lap 8—This lap proved one of the crucial points of the race, in that Lytle jumped into first place, being 9 seconds ahead of Robertson and having done the lap in 10:45, as compared with 11:02 by his rival. Lytle was given a rousing cheer as his big red Apperson rushed past with a thunderous roar. With a change of leadership new life was instilled into everyone around the grandstand and cheering of passing cars became more frequent, although it must be said the New Englanders are not of the ultra-enthusiastic class. Lytle had covered the 84.8 miles in 86:26, or over 59 miles per hour average. Grant was a safe third with a 3-minute lead on Poole and Parker, who were still contesting manfully, with Poole but 20 seconds ahead of the Fiat. The Renault momentarily lost its 12-minute reputation by having to stop for oil and take on a right rear tire, costing it 1:10. The Lozier surrendered its chances for finishing in the money by a 13-minute stop during which the intake manifold was taken off to replace a gasket that was blown out. Gas and oil were taken on and a new spark plug used. With Chevrolet and Belcher out of the running, the field was down to fifteen cars. De Palma's tire troubles kept him 8 minutes back of Lytle. In spite of making the fastest time in this lap, 10:28, he had to be content with seventh position. The American, running in its old form, made the lap in 12:22.

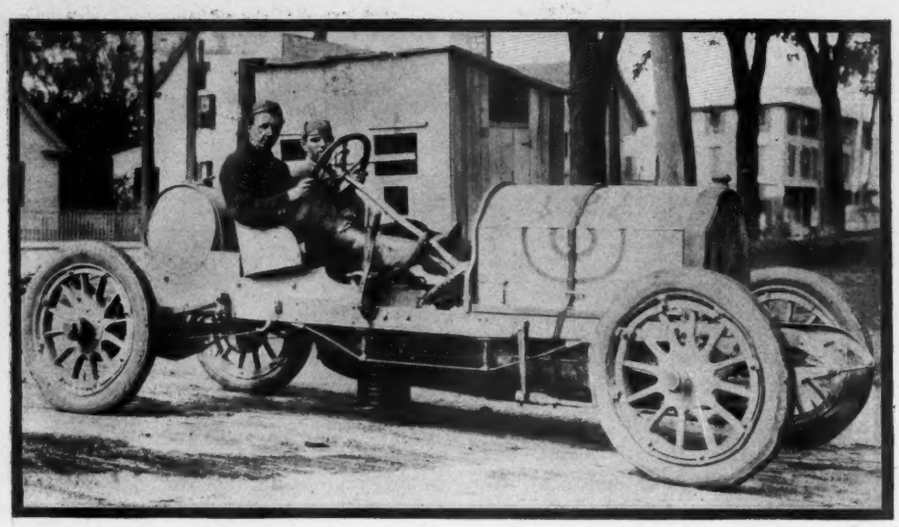
Lap 9—Lytle maintained his lead of 9 seconds over Robertson, but did more by adding 21 seconds to it, so that now he had a clear margin of half a minute, having made the lap in 10:39, while Robertson was 11 minutes flat. Grant's lap was a little slower, 11:02. Parker gained 4 seconds in the circuit on Poole and was now but 16 seconds from fourth place. This pair were running 4 minutes back of Lytle. Back of them was a 3-minute gap to the Stoddard in sixth place; 3 minutes later came de Palma, still seventh, then came a 6-minute gap to the Renault, which now was 16 minutes back of the leaders. Burman was 20 minutes from the front, having lost 6 minutes at the pit putting resin into his clutch and taking on gasoline, water and oil. This lap proved the undoing of the Allen-Kingston, which drew up with a leaky gasoline line and required 13 minutes to repair it, putting in new unions. This car had been making laps in 11:39 and around the 12-minute mark, but was 45:53 in this lap.

LYTLE IN APPERSON THAT MADE A BOLD FIGHT

Lap 10—With the ending of this lap the race was one-third over, and the order of standing was Robertson, Grant and Lytle, there having been a general shaking up of positions, Lytle dropping from first place by having to replace a tire on the back stretch and further losing 1 minute by having to get another one at the pits. His lap time was 13:21. Robertson was running several seconds slower, being 11:01, and the Alco did it in 11:08. But the shaking up was not only among these three first place contestants; the second group, the Poole-Parker combination, changed places, Parker, after losing to Poole in the fifth lap, just regaining his position. At this time Shaw was pushing his Stoddard around in 11:38 time and was solid in sixth place, with de Palma 2 minutes back. The Renault regained its reputation, doing the lap in 12 minutes flat. Strang stopped 22 minutes changing a radiator, the support having given way. Up to this third-way point Robertson made seven laps under the 11-minute mark and the other three just over it—11:01, 11:02 and 11:18. The fast laps were his first seven, at which point he slowed 20 seconds to the lap.

SHAW IN THE STODDARD-DAYTON

Lap 11—This was a sad lap for two contestants that had been attracting general attention. Lytle, who was in the limelight, went out near the end of the boulevard stretch, having stripped the teeth on a camshaft gear. General disappointment followed the announcement of this, Lytle being the dean of American road drivers and looked upon to be one of the big factors in the race. To go out with him was Shaw in his No. 15 Stoddard, which broke an axle. This cut the field to thirteen. Lytle's elimination left Robertson and Grant one, two, but brought Poole into third place, jumping as he did from fifth to third in this lap. Parker's lap was made in 11:24, but Poole cut his to 11:08 and so stood exactly 3 seconds ahead of his rival, Fiat, at the end of 116 miles of as interesting dueling as could be wished for. Both were running 5 minutes back of Robertson, and Grant split the gap between them. Twelve minutes back of Robertson came de Palma,



HUGHES IN THE ALLEN-KINGSTON IN THE BIG RACE

who lost a minute at the pits, having to stop and pull off the lower end of his exhaust manifold, which shook loose. Ten minutes back of de Palma came the Renault, which was having trouble with its spring clips and needed 15:58 for the lap. The Lozier was now 78 minutes back of the leaders, and the Allen-Kingston and Downey's Knox were in the same class. No. 14 Knox lost a lot of time replacing a broken spring clip.

Lap 12—This lap ended with Robertson Grant one, two, the Simplex being 3 minutes and 40 seconds to the good. But the Poole-Parker quarrel changed order, Parker taking the lead, as Poole had to stop 1 minute at the pit to tighten the under pan and take on water. De Palma continued in fifth place with a 11:03 lap. The Renault stopped 3 minutes to take on gasoline as well as tighten the spring clips on the left rear springs. At this point the American, Allen-Kingston and Downey's Knox were running very regularly, doing laps in 12:10, 12:16 and 12:05, respectively. Burman was getting over the clutch trouble and coming to his own with a lap in 11:13. Following one of 11:01 in the eleventh round, it showed him to be a factor that might land in fourth or fifth place before the race was over.

Lap 13—Had today been Friday and the thirteenth there might have been some reason for Strang's hard luck, as he was compelled to withdraw in this lap through magneto troubles. He started nearly 1 hour late, changed a radiator and then had to drop out. In the headliners Robertson and Grant now became a continuous attraction, they having been first and second for four consecutive laps. No. 7, Parker's Fiat lost out to Poole, being 16 minutes behind him because of work in the end of the lap. Parker had halted 1 minute to take on a couple of valves at the pit, and it was expected that he stopped in some part of the course to put them in and so went deplorably back, allowing Burman to come into fourth place with a 5-minute lead. Downey's Knox, the American and Allen-Kingston continued with laps in 12 and 13 minutes. Shaw in No. 10 Knox made the circuit in 12:32, and the Renault was slow, in 14:46. This lap saw de Palma go to fourth place. In this lap Burman and Grant made the circuit in 11:10, with Parker a minute faster.

Lap 14—This lap ended with Robertson nearly 5 minutes ahead of Grant and with de Palma up in third place. It was in the sixth that de Palma started getting out of the woods that he landed in so soon after the start with tire troubles and through eight laps he fought from ninth up to third position, gaining a few seconds each lap, his fastest being 10:28. Poole was pushed by de Palma into fourth place, Burman was fifth, 10 minutes behind him, and Parker was 5 minutes back of Burman. The Allen-Kingston stopped 5 minutes for gasoline, oil, water and changing a tire.

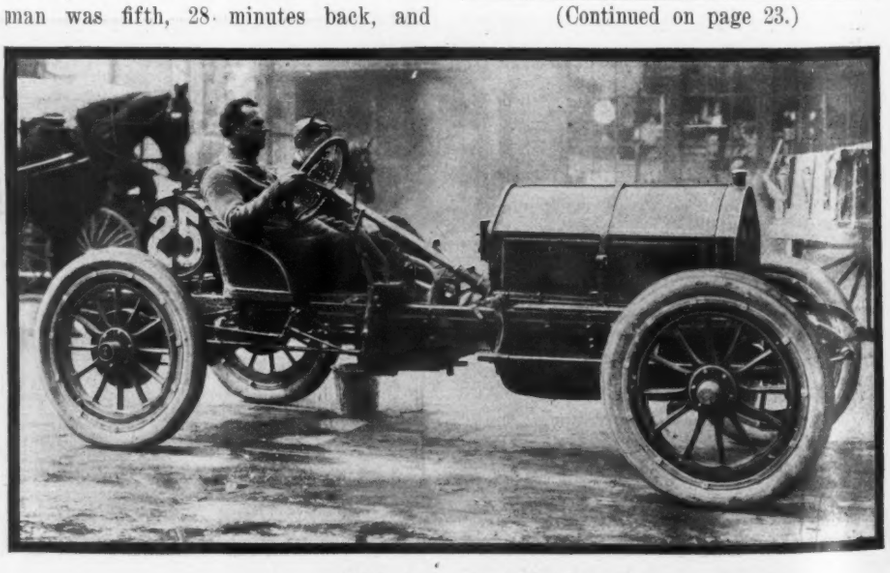
Lap 15—Robertson led at the half-way post, being over 6 minutes ahead of Grant, who was second. De Palma was third, 9 minutes back of the leader, Poole was fourth, 20 minutes from the front. Burman was fifth, 28 minutes back, and Parker was 35 minutes to the rear of the Simplex. Robertson had made the 159 miles in 165 minutes, or at 57 miles per hour. The Renault finished the half in true fashion, 12 minutes flat and in sixth position, with Parker seventh.

Lap 16—The finish of the opening lap in the last half began to give fair indications of what the end might be. The majority of the drivers were getting their second wind and settled down to steady work after having passed their trouble stages. Robertson had not stopped and was running fast. He lost 5 seconds to Grant, but the spectacular feature in this stage of the race was the herculean fight of de Palma, who was running third and but 10 minutes back of Robertson. He was making steady gains of 30 or more seconds to the lap. Burman was in the midst of his fight to regain the time lost with the clutch and was up to fifth place, with the Renault sixth and Parker's Fiat a minute later. The Lozier lost 6.5 minutes on this lap putting in a new spark plug, changing a right rear tire, taking gasoline and oil and a new valve cap. The American stopped 38 seconds for water.

Lap 17—De Palma still continued to gain, making 41 seconds on Robertson. Grant also made a gain of 2 seconds and was but 4 minutes 5 seconds behind the Simplex. De Palma was 9 minutes and 20 seconds behind Robertson. Poole was fourth and Burman fifth. De Palma, Robertson and Grant were the only ones to make this lap under the 12-minute mark. Burman stopped 45 seconds to take on a new spare tire.

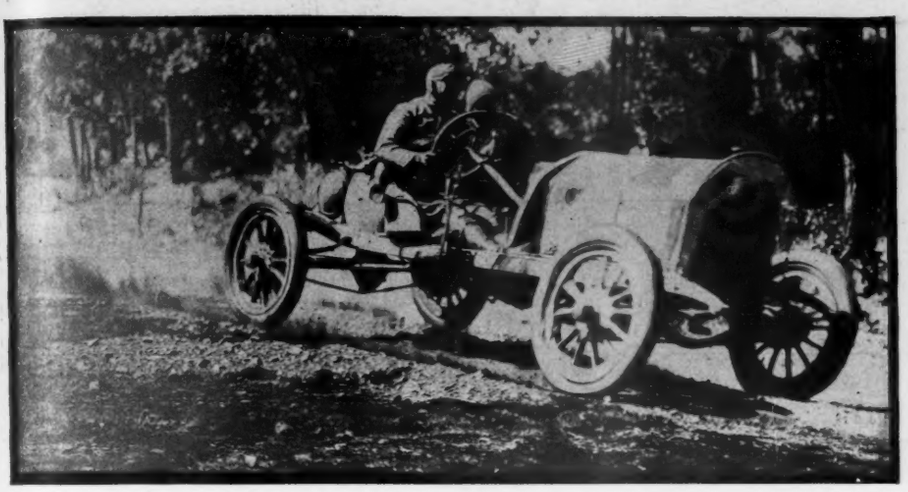
Lap 18—The interest in this lap and at this stage was the de Palma climb. He gained 30 seconds in this lap on Robertson and was now close to the Alco and it in turn was 6 minutes from Robertson. This was a uniformly good lap for all, but none of them fast, not one below the 11-minute mark. The Lozier, both Knoxes,

(Continued on page 23.)



BELCHER IN THE KNOX

THREE RACES ARE RUN SIMULTANEOUSLY



BURMAN, WINNER OF THE VESPER, ON THE S TURN

LOWELL'S FIRST DAY WINNERS

VESPER CLUB TROPHY
301 to 450 Cubic Inches, 212 Miles

Driver and Car	Min.	Sec.
1—R. Burman, Buick	229	8
2—Stoecker, Benz	242	55
3—Dingley, Chalmers	244	19

YORICK CLUB TROPHY
232 to 300 Cubic Inches, 150 Miles

Driver and Car	Min.	Sec.
1—Chevrolet, Buick	176	17
2—Harroun, Buick	195	51

MERRIMACK VALLEY TROPHY
161 to 230 Cubic Inches, 127.2 Miles

Driver and Car	Min.	Sec.
1—Knipper, Chalmers	148	43
2—See, Maxwell	160	11
3—Costello, Maxwell	164	1

LOWELL, Mass., Sept. 6—The opening today of the Lowell 3-day carnival week of motoring conducted by the American Automobile Association with the assistance of the Lowell Automobile Club has been of the most sanguine character, the three races billed having been run off simultaneously on the same course. Lowell catered for national recognition 1 year ago and with its experiences of last year it bid boldly for the national stock chassis races this year and got them. Lowell has a course well suited for road racing in that it is but 10 miles in extent, giving the grand stand some form of excitement nearly every minute while the race is on.

Although from a racing point of view today's three events have been of the highest order the policing of the course by the soldiers in civilian clothes and with a 6-inch white badge has not been a success; and the state will have to give better assurances of road-guarding before the chances for another national meet here would be specially bright.

The spectators crossed the course at will, the military patrols in many places making no effort to even ask them not to do so. The referee delayed the start for ½ hour making the official starting time at 10:30. The grand stand crowds were disappointing, not more than one-half of the stand being filled. But what the stand lacked the fields along the roads made up for. There were miles of camp chairs carried out for the occasion, grand stands were on every lot and although the stands were not filled the parking spaces and seat spaces were. But Lowell did not lose on the partly filled grand stand because the roads entering the course at many points were guarded and those entering by way of these roads had to pay an entrance fee of 25 cents whether they stood by the roadside or sat in a field. Permission to make this charge was secured from the state and it will go far toward filling the big drains.

The sport today, with few exceptions, has been of the disappointing character such as at the grand prize race in Savannah last fall when Nazarro led to the last lap and then lost out. With as clear a morning as New England can boast of and with roads dry but no dust, the crowds began moving courseward before 7 o'clock, although the start was not billed until 10. The fact that three distinct races were carded was sufficient interest to bring out not alone the Lowellites but thousands from surrounding country, Boston and the other big cities. Over 200,000 witnessed the race.

The running of three races over one course

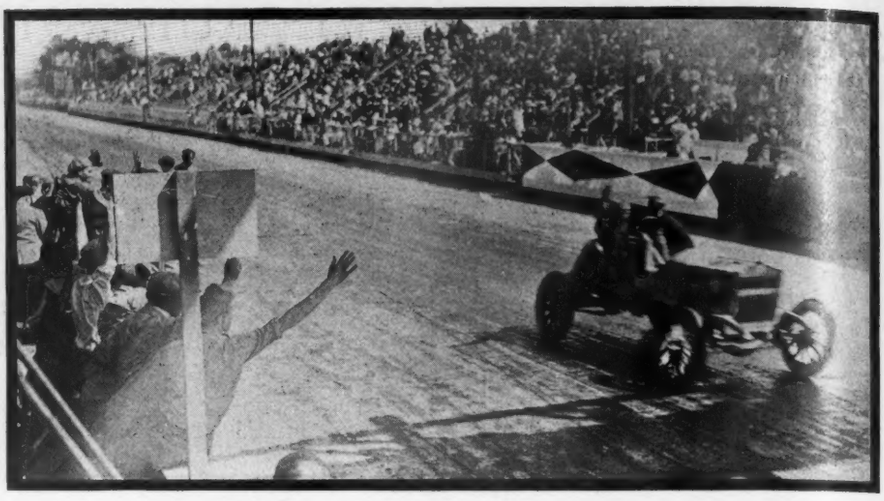
STATISTICS OF CARS IN THE THREE RACES ON MONDAY

Car and Driver	Weight	Bore	Stroke	Volume
VESPER CUP STARTERS				
A—Chalmers 40, Lorimer	2,295	5	4.75	373.16
C—Knox R, Shaw	2,317	5	4.75	373.16
E—Benz, Stoecker	2,790	4.72	5.31	365
G—Buick 16-B, Strang	2,430	4.5	5	318
H—Chalmers 40, Dingley	2,315	5	4.75	373.1
J—Buick 16-B, Burman	2,240	4.5	5	318
K—Knox R, Belcher	2,345	5	4.75	373.16
L—Sharp-Arrow, Sharp	2,240	5	5	392.8
STARTERS IN THE YORICK TROPHY RACE				
30—Columbia 48-4, Coffey	2,245	4.5	4.7	298.92
31—Buick 16-A, Chevrolet	2,240	4 23-64	5	298.5
32—Atlas E, Knox	2,535	4.5	4.5	286.2
33—Buick 16-A, Harroun	2,155	4 23-64	5	298.5
34—Moon C, Davis	2,460	4 9-16	4.5	294.28
35—Mercedes, Popperday	1,820	3.94	5.11	248.7
STARTERS IN THE MERRIMACK VALLEY TROPHY RACE				
40—Buick 10, DeWitt	1,605	3.75	3.75	165.6
41—Maxwell Q Special, Sickinger	1,505	3.875	4	188.64
42—Chalmers 30, Knipper	1,927	4	4.5	226.28
43—Buick 10, Grenon	1,525	3.75	3.75	165.6
44—Maxwell Q Special, See	1,520	3.875	4	188.64
45—Maxwell Q Special, Costello	1,500	3.875	4	188.64
46—Chalmers 30, Matson	1,960	4	4.5	226.28
47—Chalmers 30, Gelnaw	1,975	4	4.5	226.28

STOECKER IN THE BENZ, SECOND IN VESPER CUP RACE

at the same time had been tried and tried successfully at the parkway sweepstakes last fall and today the affair gave an interesting three-phase attraction. The twenty-three cars to start were on hand at 9 o'clock and Starter Wagner lined them up, sending away the fastest class first, the second fastest next and the small cars third and last. The three races were as follows: For the Vesper trophy, 212 miles, twenty laps for cars with piston displacement of from 301 to 450 cubic inches; for the Yorick trophy, 159 miles, fifteen laps and for cars with piston displacement 231 to 300 cubic inches; and for the Merrimack Valley trophy, 127.2 miles, twelve laps for cars in the 161 to 230 cubic inch piston displacement class.

All twenty-three were sent off at 20-second intervals, so that often before a car was past the end of the grand stand another was starting. There was not any halt between the classes, but all went off as if competing in the same race. It was scarcely a 5-minute wait after the last car was off until the bugle sounded "Car coming" and everybody craned to see who would be first to pass the grand stand. Up loomed a big "A" on the radiator as the car approached at a 75-mile-an-hour pace and a cheer went up as Lorimer with his Chalmers rushed by and set the racing carnival ball rolling properly. In a moment he had passed the turn and was out of sight. Then everybody looked for the next car, but it was fully 2 minutes after Lorimer passed before the bugle sounded and the megaphone announced "Four cars coming, six cars coming." This brought all the grand stand to its feet and a few seconds later the Benz went by with Burman a half length behind him; and scarcely two car lengths back came Dingley in his Chalmers and Belcher in the Knox side by side, with Dingley in advantage of a couple of feet. Not 20 yards back came Strang. These were all Vesper cars, but Chevrolet in the Yorick class was not 100 yards behind, he being first of this class to finish the initial lap. Knipper was first



SEE IN THE MAXWELL PASSING GRAND STAND IN MERRIMACK VALLEY RACE

of the Merrimack nine to heave in sight, but soon after him came the others. For a lap or so the big class kept in a section of the course bunched among themselves, but soon Lorimer began his lapping role and Vesper, Yorick and Merrimack cars were all mixed in one mass. Not once, however, during the part of the race in which all three classes were on the course did the cars get scattered all around the 10-mile circuit. They were generally well bunched, which was partly due to the fact that the narrow back stretch held the faster ones back a little.

From a grand stand point of view the race was spectacular as a lot of passing was done, but owing to the width of the road the curiosity as to whether one car could pass another or not was lost, because once on the boulevard it was solely a case of horsepower as the road was wide enough for any driver to get ahead. This width factor made many of the cars hit their highest speeds at the grand stand, the drivers realizing that it was up to them to pass on the boulevard or be held back somewhat on the back stretch.

After the first lap the crowd sat down to a quiet passing of the time, a few cheers punctuating the races as a leader passed or a crew made a particularly fast tire change or fuel replenishment at the pits.

In the Vesper class the race was a runaway for Lorimer in his Chalmers until the eighteenth lap, when through carelessness in not taking on a supply of oil at the pits a piston apparently seized and destroyed a cylinder casting and the crankcase. Lorimer drove a beautiful race up to this time and was more than a lap ahead of everybody else. He made but one stop and that for tires and gasoline and water at the end of the seventeenth lap. For laps his time rarely varied beyond a few seconds, as he drove all sixteen laps in which he did not stop in less than 11 minutes each and the seventeenth lap, in which he stopped, was made in less than 12 minutes. His fastest lap was the eighth, made in 10:31; he had two in 10:36 each, two in 10:39, two in 10:43 and others in 10:37 up to 10:58. It was a great disappointment to the crowds when he failed to come around in his usual time on the eighteenth lap.

There was no fight for second place up to the time Lorimer dropped out, because Burman was safe and the real struggle was for third position among Davis in Benz, Strang in Buick and Dingley in Chalmers.

BILLY KNIPPER IN CHALMERS-DETROIT, WINNER OF MERRIMACK VALLEY TROPHY

Running of the Vesper

Lap 1—Burman in his Buick carrying the letter J was leader, having jumped into premier position by doing the lap in 10:28, or 60.1 miles per hour, which gave him a 30-second lead over Lorimer with his No. A Chalmers. It was apparent from the start that the Chalmers-Buick duel was to be one of the features of the race and everybody expected to see one of each team go out to set the fastest kind of a pace and Burman seemed to be doing this for one team and Lorimer for the other. Dingley, Lorimer's running mate, was a good third in 11:50 and Strang with his Buick evened matters up by getting fourth position in the lap with 12:05. Belcher's Knox was fifth, the Benz sixth and Sharp-Arrow seventh.

Lap 2—This was a Chalmer lap in that

Lorimer by a circuit in 10:36 landed first place, disposing Burman and Dingley in his H Chalmers doing a lap in 11:32 landed second position with Strang a close third, Belcher in Knox fourth and Benz fifth. This was a slow circuit for Burman, he requiring 15:39.

Lap 3—It was apparent that Lorimer intended to make a runaway of it, as each lap saw him adding almost a minute to his lead. Being first to start, he had a peculiar position all alone at the head of the line with no other car very close either in front or behind. This lap saw Lorimer, Dingley and Strang maintain their one, two, three positions with Benz and Burman close followers. In this lap Shaw in Knox carrying No. C skidded into the bank on the curve into the home stretch and his left rear wheel collapsed, throwing the mechanic against a tree, breaking his leg. The car narrowly escaped hitting some spectators. A small Buick had wrenched a wheel on this turn but a few minutes before the Knox came along and it was in his attempt to keep outside of the Buick car that Shaw collided with the bank.

Lap 4—This lap saw Lorimer place almost 4 minutes between himself and Strang, who by a lap in 11:04, his fastest so far, had wrested second place from the Chalmers' ranks. Dingley dropped to third and close after was Burman, who by a circuit in 10:59 was rapidly gaining on second place. A long stop at the pits dropped Belcher last with Benz and Sharp-Arrow in fifth and sixth.

Lap 5—Lorimer still continued his space-devouring pace and with the race one-quarter over was a good 4 minutes in advance of his nearest adversary, Strang, with Dingley but 16 seconds behind the latter. The Chalmers-Buick duel continued, the former in the ascendancy, but with the Buick pair putting up a tremendous struggle. The Benz, Sharp and Knox followed in the order named, the Benz 7 minutes behind the leader and the Sharp 10.

Laps 6 and 7—No change of positions took place in these laps, the only factor affecting the relative standing being the long stop at the grand stand by Belcher to re-time the Knox motor. At this time dispatches from the back stretch told of the road surface standing up well under the tremendous strain, the tar working through to the surface by the burning hot sun and the work of the tires.

GROUP OF RACE OFFICIALS READY FOR WORK ON MONDAY

Lap 8—Lap 8 saw Burman jump ahead of Dingley, thus making Buick second and third, both in hot pursuit of Lorimer, who was making a runaway race of it, gaining in his lead every lap. Dingley by a stop to tighten a clutch spring, had a slow lap, allowing the Benz to pass him and with only the Sharp and Knox back of him. This was Lorimer's fastest lap, the mark being 10:31 and only 3 seconds slower than Burman's first, which later proved to be the fastest of the day, being 60.1 miles per hour.

Laps 9 and 10—The relative standing of the contestants did not change in these laps, the order remaining Lorimer, Strang, Burman, Benz, Dingley, Sharp and Knox. At the half-way post Lorimer had a clear time gap of 6.5 minutes between him and Strang, with Burman not a minute later. Lorimer had made 106 miles in 107 minutes 4 seconds, a 60-mile gait in a 40-horsepower car over a course with three turns to every mile.

Laps 11 to 13—Lap 11 was not eventful, the drivers not changing places, but Burman was slowly creeping up on Strang, who had been in second place for several laps. Strang had a lead of but 8 seconds over Burman. In lap 12 the expected happened and Burman jumped into second place, which he held until lap 18, Strang moving down one position. To get a conception of the pace Lorimer was setting it will suffice to say that at the end of lap 13 he was over 8.5 minutes ahead of Burman and 20 minutes in the lead of Dingley, who was still running fifth.

Laps 14 to 17—During these four laps there was not a change in the relative standing of the cars, the order being Lorimer, Burman, Strang, Benz, Dingley, Sharp-Arrow and Knox. Lorimer was increasing his lead over Burman in every lap. In lap 14 it was 12 minutes, in the next lap it was 13 and in the following lap it was 14, there being a minute added in each. The Benz began gradually starting to overtake Strang, cutting his margin to

DETAILS OF THE RUNNING OF VESPER CUP RACE WON BY BURMAN IN THE BUICK

No.	Car	Driver	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
J	Buick.....	Burman..	* 10:28 † 10:28	26:07 15:39	36:56 10:49	47:55 10:59	58:48 10:53	69:55 11:07	81:06 11:11	92:09 11:03	103:16 11:07	114:45 11:29	125:27 10:42	136:24 10:57	147:40 11:16	161:58 14:18	173:27 13:29	185:33 12:06	195:45 10:12	206:51 11:06	217:51 11:00	229:08 11:17
E	Benz	Stoecker .	* 12:30 † 12:30	25:29 12:59	36:26 10:57	48:17 11:51	60:32 12:15	72:34 12:02	84:22 11:48	96:15 11:53	108:06 11:51	119:54 11:48	131:43 11:49	143:30 11:27	155:18 11:48	167:14 11:56	179 05 11:51	191:03 11:58	203:00 11:57	215:08 12:08	240:00 14:52	242:55 12:55
H	Chalmers-Detroit	Dingley ..	* 11:50 † 11:50	23:22 11:32	34:49 11:27	46:20 11:31	57:47 11:27	76:17 18:30	80:40 14:23	96:39 15:59	111:00 14:21	123:46 12:46	135:00 11:14	147:13 12:13	159:23 12:10	171:16 11:53	182:19 11:03	195:17 12:58	207:24 12:07	219:48 12:24	232:15 12:27	244:19 12:04
L	Sharp Arrow	Sharp	* 12:41 † 12:41	25:27 12:46	38:00 12:43	50:43 12:43	63:22 12:39	75:43 12:21	88:04 12:21	100:19 12:15	112:40 12:21	124:45 12:05	136:48 12:03	148:57 12:09	161:08 12:11	173:21 12:13	187:04 13:43	199:21 12:17	211:33 12:12	223:35 12:02	237:12 13:37	249:50 12:38
G	Buick	Strang ...	* 12:05 † 12:05	23:53 11:48	35:20 11:27	46:24 11:04	57:31 11:07	68:45 11:14	79:51 11:06	91:08 11:17	102 25 11:17	113:37 11:12	125:19 11:42	139:20 14:01	150:43 11:23	162:12 11:29	177:27 15:15	188:58 11:31	200:27 11:29	216:53 16:26	232:27 15:34	246:33 14:07
K	Knox.....	Be cher ..	* 12:21 † 12:21	24:39 12:18	43:34 18:55	58:42 15:08	74:47 16:05	108:44 23:57	121:07 12:23	133:35 12:28	149:57 16:22	162:45 12:48	175:43 12:58	188:29 12:46	199:26 10:57	214:13 14:47	226:32 12:19	239:12 12:40	Still	runn	ing	
A	Chalmers-Detroit	Lorimer..	* 10:58 † 10:58	21:34 10:36	32:17 10:43	43:08 10:51	53:45 10:37	64:24 10:39	75:07 10:43	85:38 10:31	96:17 10:39	107:04 10:47	117:47 10:43	128:25 10:38	139:01 10:36	149:50 10:49	160:29 10:39	171:09 10:40	182:26 11:17	Broke	mot	or
C	Knox.....	Shaw.....	* 15:43 † 15:43	34:15 18:32	Out.	Broke	right	rear	wheel	on tu	rn											

* Elapsed time † Time lap

YORICK TROPHY EVENT AT 159 MILES, WHICH WAS WON BY LOUIS CHEVROLET IN A BUICK

No.	Car	Driver	Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
31	Buick	Chevrolet	Elapsed time	11:14	22:10	33:18	44:14	55:34	66:44	77:30	92:28	103:25	114:43	129:52	142:25	153:45	165:05	176:17
			Lap time	11:14	10:56	11:08	10:56	11:20	11:10	10:46	14:58	10:57	11:18	15:09	12:33	11:20	11:20	11:12
33	Buick	Harroun	Elapsed time	12:48	27:23	42:46	54:42	66:17	77:32	88:42	100:00	111:25	137:50	149:34	161:44	173:07	184:42	195:51
			Lap time	12:48	14:35	15:23	11:56	11:35	11:15	11:10	11:18	11:25	26:25	11:44	12:10	11:23	11:35	11:09
35	Mercedes	Pepperday	Elapsed time	13:50	27:34	47:37	61:33	75:26	89:21	103:12	117:37	132:07	170:53	Out—	broken	oiler	shaft	
			Lap time	13:50	13:44	20:03	13:56	13:53	13:55	13:51	14:25	14:30	38:46					
32	Atlas	Knox	Elapsed time	13:56	27:36	41:31	55:52	Threw off two rear rims										
			Lap time	13:56	13:40	13:55	14:21											
30	Columbia	Coffey	Elapsed time	12:12	23:47	Broke right steering knuckle												
			Lap time	12:12	11:35													
34	Moon	Davis	Elapsed time	15:03	Out—Blocked up gasoline lead													
			Lap time	15:03														

4 minutes in lap 14 and reducing this a couple of minutes in the following lap.

Lap 18—This proved the disastrous one for Lorimer. At the end of the seventeenth he stopped for water and gasoline, but forgot to take oil and on the back stretch in lap 18 his pistons apparently seized and the cylinder castings were cracked and Lorimer steered the car off the course into a farm yard and struck a chair on which a spectator was sitting, not injuring her. The word was late getting to the grand stand. It changed the entire aspect of the race. Lorimer had driven a beautiful race and every time he passed, the grand stand applauded. He had covered 180 miles and made one stop in 182 minutes 26 seconds, or maintained a 60-miles-an-hour clip. This moved Burman, who was running 13 minutes behind Lorimer, up into first place, and Benz stepped ahead of Strang and thus took second place for the first time, but retained it until the end. Strang was still in third place with Dingley 3 minutes back in fourth.

The End—Lap 19 was marked by Dingley putting his Chalmers ahead of Strang, and thus annexing third position by a margin of but 12 seconds which he increased to a couple of minutes before the last lap. Burman held first place with a 13.5-minute lead over Benz and who in turn had nearly 2 minutes over Dingley. Sharp-Arrow was fifth and Belcher sixth.

Merrimack Race Trophy

No other one of the three races ran here today flavored more of the true manufacturers' rivalry than the 159-mile run of cars with piston displacement ranging between 161 and 230 cubic inches. There were nine starters, three each of Chalmers, Maxwells and Buicks. The Chalmers were the Thirty type with 4-inch bore and 4.5-inch stroke; the Maxwells were model Q Specials with four cylinders each of 3.875-inch bore and 4-inch stroke; and the Buicks were model 10's with cylinders 3.75 inches square. From a motor point of view the Chalmers had the advantage with 226.28 cubic inches piston displacement to 188.64 in the Maxwells and 165.6 in the Buick. Both Chalmers and Maxwell cars carry sliding gear sets and the Buick a planetary set. What advantage the Chalmers had by larger piston displacement was partly offset by the heavier weight, each tipping the scales at about 1,950, whereas both the Maxwells and Buicks checked in at from 1,500 to 1,520 pounds.

MATSON IN CHALMERS PASSING SEE IN MAXWELL IN BACK STRETCH

The race opened in the first lap with Knipper in No. 42 Chalmers playing the runaway role, just as Lorimer was doing in the big race. He annexed first place at the end of lap 1 by doing it in 12:40, while his team mate, Matson, was doing the lap in 12:46. Costello in No. 45 Maxwell upheld the Tarrytown colors by a 13:10 lap, which landed him in third place; and Buick got mixed into fourth place by DeWitt putting No. 40 around in 13:13. This divided honors fairly evenly in the opening lap, with Chalmers carrying the lion's share.

In the second lap Matson's took first place from Knipper, his time for the two laps being 25.22, just 10 seconds better than Knipper. Costello and See had Maxwells in third and fourth places, scarcely a minute back of the Chalmers pair, and Disbrow brought No. 49 Buick into fifth honors, a couple of minutes later than the Maxwells. The third Chalmers and the Maxwell were on even terms. The other two Buicks were out, one through a broken wheel, the other a rear axle trouble. It was now apparent the contest was to be a Chalmers-Maxwell one, the Buick end being two-thirds gone.

Lap 3 saw Joe Matson establish himself in the lead over Knipper with a leeway of nearly a minute and it looked as if the winner of the Indiana trophy was to annex the Merrimack valley guerdon to his laurels. With Chalmers in first and second, the Maxwell cars were close third and fourth, Costello being but 4 seconds back of Knipper and See but 40 seconds back.

Lap 4 saw this race settle into a fighting quartet of two Chalmers and two Maxwells, with Knipper and Matson the Chalmers team mates and Costello and See the Maxwell hopes. At the end of this lap the Chalmers were leading by a minute and about 20 seconds, with a stiff fight between Knipper and Matson, who were but 2 seconds apart, as between Costello and See, who were but 1 second difference in time with the race one-third over. At this point the grand stand in places awakened to the fact that these four little cars were battling with keener rivalry than many of the big machines in the other two races.

Lap 5 was a slow one for Matson, he having trouble with spark plugs, which lost him second place, putting both of the Maxwells between him and Knipper, who had 2 minutes' leaway on the Maxwells, whereas Matson was more than that to the bad, so that it was about six of Chalmers and half a dozen Maxwell. Lap 6 saw this position maintained, with Knipper 3 minutes ahead of Costello, who was leading in the Maxwell camp, and Matson trying to make up what he had lost in the previous lap. But Matson went from bad to worse, more

spark plug trouble put him 13 minutes back of Knipper in lap seven, with Knipper 4 minutes up on Costello. In lap 8 Knipper gained a few more seconds; in lap 9 he was 5.5 minutes up and barring trouble he looked a certain winner, although it could not be overlooked that the Maxwells had been running from the start without a stop and the prospects were that they could so continue to the end. Laps 10, 11 and 12 say Billy Knipper gradually gain a few seconds each lap until at the end of the twelfth and final one he led See by over 11 minutes, Costello having lost his standing by having to stop at the pits and rope his extra oil tank, which worked loose. He finished, however, 8 minutes in advance of Matson.

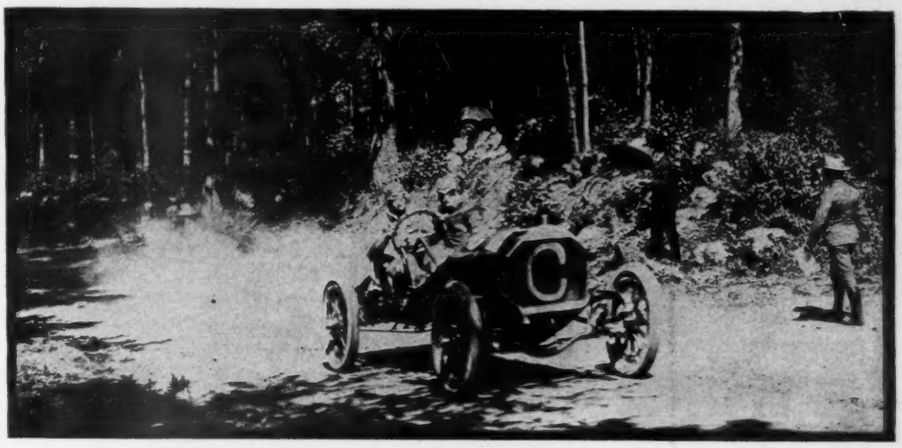
Before the race was over it was noised around the contest board quarters that a protest had been filed by the Maxwell company against Knipper for making two circuits without a bonnet in the earlier part of the race, the bonnet having dropped off while the mechanic was working on the carbureter. This greatly upset calculations, as nobody knew whether Knipper would be winner or not until the protest was decided. The protest investigation showed that in the lap following that on which the bonnet was lost he had looked for it but it had been picked up and placed back from the road. On the following lap he discovered it and put it on. The complete decision of the contest board on the matter, in which the protest was not allowed, is as follows:

"The protest against the Chalmers-Detroit car No. 42 for not carrying a hood at all times during the contest has been duly considered by the contest board and its decision is as follows: 'It seems that the hood fell from the car on the second lap on one of the curves of the back stretch and that the car did not stop but proceeded on its way. On the next lap the driver and mechanic made effort to locate it but failed. On the following lap it was discovered in a field, picked up by the driver and mechanic and replaced on the car. The committee, in investigating the case, found that at the place where the hood was dropped it would have been dangerous for the car to have stopped within any reasonable distance. The committee also found that the hood was carried away by boys. It was discovered by an occupant of a nearby camp, who carried it to an open field near the road and placed it in plain sight. Taking all matters into consideration the committee believe that the driver used all diligence in trying to locate the hood and therefore the protest is not sustained.' "

Yorick Club Trophy Race

Chevrolet's glory of winning the 159-mile run for the Yorick club trophy today was greatly marred by the fact that only two of the six cars that started finished and both of these were Buicks. Harroun, driving No. 33, which finished second, was nearly 20 minutes back of the Frenchman, who drove a winning race from start to finish but without competition of any nature after the first five laps. Chevrolet's performance is a commendable one when compared with that of the cars in the bigger classification, for at the end of lap fifteen his time was not 3 minutes slower than that of Burman, who won in the bigger class. He had but three stops in this event, the first to put in a couple of spark plugs, the second when he burst a tire on the stretch just approaching the hairpin, and the third when he took on oil and a spare tire at the grand stand towards the end of the race. Harroun, his running mate to finish, had three stops, twice when he made complete changes of spark plugs and a third time when several plugs were changed. This car did not take on gasoline oil or water and had no tire troubles.

This race for the Yorick trophy might well be termed a calamity race, with its 66.6 per cent to fall by the wayside. The Moon was first out, not completing its second lap. At the end of lap one it stopped at the pits to adjust the carbureter and then started, but never completed the second circuit. The Columbia, driven by Coffey, went out when ½ mile past the grand stand on the third lap. Just after taking a slight right curve on the boulevards the right steering knuckle arm leading back to the tie rod joining the knuckles broke. The car took the left ditch, the driver being able to hold it a little with the left knuckle. It tore down a line of wood stakes, cut one-half of a telegraph pole off and finally ended in a



SHAW IN KNOX ON FIRST ROUND OF VESPER CUP RACE

MERRIMACK RIVER TROPHY RACE WON BY KNIPPER IN CHALMERS-DETROIT

No.	CAR	DRIVER	TIME	1	2	3	4	5	6	7	8	9	10	11	12
42	Chalmers-Detroit	Wm. Knipper	Elapsed time	12:40	25:32	39:11	51:16	63:25	75:46	87:35	100:28	112:33	124:48	136:48	148:43
			Lap time	12:40	12:52	13:39	12:05	12:09	12:21	11:59	12:53	12:05	12:13	11:59	11:05
44	Maxwell	Arthur See	Elapsed time	14:25	26:44	39:53	52:40	66:39	80:05	94:23	106:41	120:05	133:29	146:46	160:11
			Lap time	14:25	12:19	13:08	12:47	11:59	13:26	14:18	12:18	13:24	13:24	13:17	13:25
45	Maxwell	Thos. Costello	Elapsed time	13:10	26:03	39:15	52:39	65:37	78:40	91:54	105:02	118:03	136:18	150:50	164:01
			Lap time	13:10	12:53	13:12	13:24	12:58	13:03	13:14	13:08	13:01	18:15	14:32	13:10
46	Chalmers-Detroit	Joe M. Matson	Elapsed time	12:46	25:22	38:24	51:18	68:56	81:56	102:40	116:15	130:05	143:33	157:53	172:16
			Lap time	12:46	12:36	13:02	12:54	17:38	13:00	20:44	13:35	17:25	13:28	14:20	14:23
49	Buick	L. A. Disbrow	Elapsed time	15:00	28:39	44:15	64:06	71:49	85:18	98:49	112:18	125:45	139:13	152:52	172:37
			Lap time	15 00	13:39	15:36	20·50	.....	13:39	13:31	13:29	13:27	13:28	13:39	19:05
41	Maxwell	Wm. Sickenger	Elapsed time	16:30	30:49	46:09	61:17	76:10	91:03	105:44	120:15	134:42	149:20	163:54	178:34
			Lap time	16:30	14:19	15:20	15:08	14:53	14:53	14:41	14:31	14:27	14:38	14:34	14:50
47	Chalmers-Detroit	Frank Gelnau	Elapsed time	13:59	30:41	44:15	62:21	82:37	96:15	112:34	131:44	148:42	161:42	175:36	191:17
			Lap time	13:59	16:42	13:34	18:06	20:16	13:38	16:19	19:10	16:58	13:00	13:00	17:11
40	Buick	G. De Witt	Elapsed time	13:13	Out—	Brok	en re	ar wh	eel	....	....	....	....	....	....
			Lap time	13:13	....	....	....	....	....	....	....	....	....	....	....
43	Buick	J. J. Grennan	Elapsed time	Did	not	fin	ish	first	lap—	rear	axle	trouble			
			Lap time												

LYTLE IN APPERSON AND CHEVROLET IN BUICK, WHO WERE STARS IN THE TIME TRIALS ON TUESDAY

deep bank on which were crowds sitting, none of whom were hurt. The Atlas, driven by Elmer G. Knox, went out through a peculiar happening on the fifth lap. It threw both rear tires on a turn on the back stretch and the detachable rings when thrown off were struck by another car and sent far down the road and badly damaged.

Story of the Repair Pits

A road race is a polyphase performance: those who go for the entertainment afforded by a panorama of cars whizzing by between lanes of spectators constitute one phase; those who attend with the hope of learning some comparisons among rival makes of machines have an opportunity of satisfying that aim, and those who go to study car constructions as tested by continuous high-speed work have an equally good opportunity to obtain such. Today's races were novel in that, owing to three separate and distinct races going on at the same time, they gave an opportunity not only to compare the relative performances of cars of a certain classification, but brought high, low and medium-priced machines before the spectator at the same instant.

Today has been a day for the low or medium-priced machine in that the nine cars in the 161-230 piston displacement showed a better average performance than did those machines in the 231-300 class or the still bigger ones in the 301-450 category. The little fellows, as everybody has christened them today, namely, the 161-230 class, carried off the highest honors—nine of them started in their race and seven of them finished, the two to drop out being a couple of model 10 Buicks. The 301-450 class took second place in that eight of them started in their race and six finished, only a Chalmers Forty and Knox model R dropping out. The 231-300 cubic inch piston displacement class fared worst in that of the six starters only two were running at the finish, the other four, namely, Columbia, Atlas, Moon and Mercedes having dropped out for one trouble or another. It must be remembered that the distances covered by these three classes differed very widely, the small class traveling but 127 miles, the second class 159 miles and the big class 212 miles. Of the twenty-three that started fifteen finished, eight fell out. Of the eight that dropped out six went out directly because of breaking car parts and two were eliminated partly through breakages and partly due to an accident such as striking a bank or skidding into a ditch. Here in a nutshell is the elimination list: Buick broke a rear wheel, Buick injured a rear axle, Columbia broke a steering knuckle, Moon had trouble with a stopped gasoline line, Mercedes broke a pump-driving shaft, Chalmers broke cylinders and a crankcase, Atlas threw and had injured beyond repair two rear wheel detachable tire rings, and Knox crushed a rear wheel when it struck the bank making the turn onto the home stretch.

In the multiple-entry class the three Maxwell Q specials carried off the palm in that all three finished, this being the only make of car with more than one entry in which all finished. Of the five Chalmers that started four finished; five of the seven Buicks that started finished; and one of the two Knoxes. There were six individual entries, that is, six different makes of which only one car of each was entered.

There were only fourteen stops made in front of the grand stand repair pits in the three races. Belcher in Knox K was the heaviest grand stand loser, his two stops totalling up to 17 minutes, all due to ignition troubles. The first stop was for 6 minutes, when the coil was tested and a couple of new spark plugs used. This did not remedy the trouble and the following lap, soon after the start of the race, a 17-minute stop was made when it was discovered a tooth or so on the magneto gear were stripped and a new gear was used and the motor re-timed. At this time a complete set of new spark plugs was put in on the magneto side. Not a single one of the other contestants had to make two stops at the pits. Only one of the Maxwells, Costello's, stopped in the entire race.

No. 47 Chalmers lost 2 minutes in taking on a couple of spare tires and adding water. No. H Chalmers lost 3 minutes taking on water, gasoline and oil and tightening the clutch spring. No. 42 Chalmers, winner in the small race, stopped for water, adjusted the carbureter and took on a spare tire, losing 1 minute. The only stop made by the Benz was 40 seconds to take on a spare tire. No. L Sharp Arrow lost 1 minute 10 seconds taking oil and strapping on an extra tire. Burman in No. J Buick lost 37 seconds taking on oil. Strang in G Buick required 1.5 minute for oil and taking on a right rear tire. Chevrolet lost 1 minute by having to stop to take on oil and a spare tire and jack. No. 33 Buick in the same class and driven by Harroun had a 2-minute pause to change spark plugs. No. 32 Atlas was but 50 seconds taking oil and water. Moon No. 34 lost 4 minutes adjusting the carbureter.

Burman's equipment included Schebler carbureter, Remy magneto and Michelin tires. Chevrolet had the same on his car. Knipper in his Chalmers used a Kingston carbureter, Bosch magneto and Diamond tires on Diamond demountable rims. The three Maxwell cars using Ajax tires did not make a single tire stop.

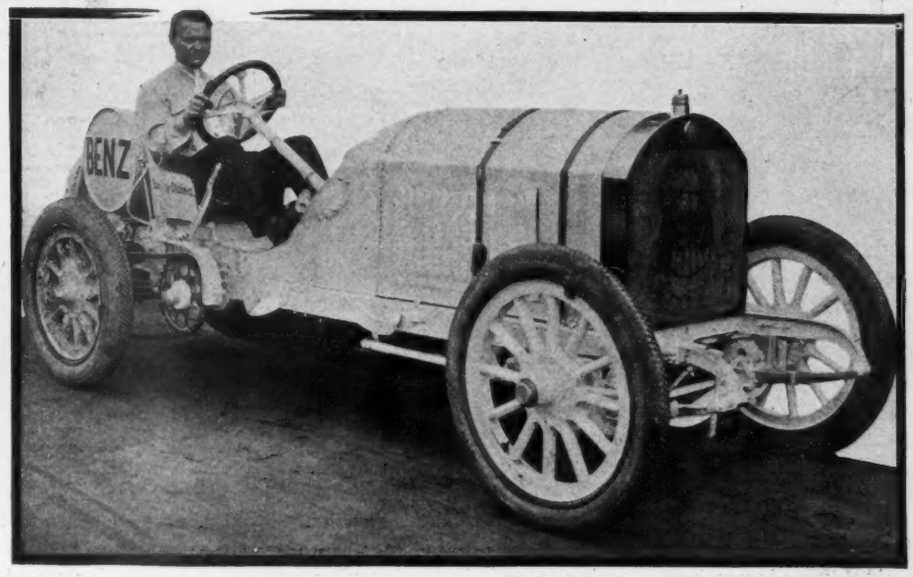
BENZ SHOWS BEST SPEED IN THE TIME TRIALS

LOWELL, Mass, Sept. 7—Special telegram —A new record slate has been produced today in that it was the first mile straightaway trials under the present price and piston displacement classification of the American Automobile Association. The course, a measured mile on the boulevard side of the 10-mile road race circuit, was in good shape, but the cars had to face a stiff wind which greatly reduced the speed. The course, although called a straightaway, is not so, correctly speaking, in that there is a perceptible turn in it after the start. It was intended to have nothing but flying starts, but the poor getaways made this impossible and with a few exceptions nothing but standing starts were used.

In all twenty-three cars started, some as full touring cars carrying but the driver, and others as stripped chassis. The timing was done by an electric button and not by mechanical means, and it was discussed at first as to whether the records would be officially allowed because of this. A continued session of the contest committee finally resulted in their being allowed.

The speed honors went to Oldfield in the big grand prix Benz, which in its second attempt placed the mile figures at 39.9 seconds, or 90.2 miles per hour. In his first attempt at the mile Oldfield made it in :41. Second honors went to the veteran Herbert Lytle, driving the Apperson Jackrabbit, his mark being 44.4 seconds, or at a speed of 81 miles per hour. Lytle's performance astonished a great many of the spectators, as the car's performance was much superior to any previous one seen by it.

Chevrolet sprang a surprise when with his 16-B car he negotiated the mile in 49.9 seconds or at 72.1 miles per hour. These were the four really fast times made, but



BARNEY OLDFIELD IN RECORD-BREAKING BENZ

the performances of the stock cars were particularly creditable, as many of them were not in the slightest prepared for the work.

In event 1 the Jackson had its regular touring car body on. Its speed was 56.4 miles per hour. In the second event the Matheson six was a new car fresh from the factory and carried a toy tonneau body. Its performance was 57.8 miles per hour with a regular touring gear ratio. The Columbia stripped chassis in event 4, the free-for-all, averaged 59.9 miles per hour. Summaries of the events:

Event 1, stock cars $1,251 to $2,000, flying start—

Car	Bore and stroke	Driver	Time
Jackson	4¾x4¾	Lynch	1:03 8-10

Event 2, stock cars $2,001 to $3,000, flying start—

Matheson six	4½x5		1:02 2-10

Event 3, stock cars $4,001 or over, standing start—

Apperson	5¾x5¾	Lytle	1:02 7-10
Knox six	5 x4¾	Belcher	Stopped

Event 4, free-for-all, standing start—

Benz		Oldfield	:51 2-10
Buick	4½x5	Cheyrolet	:59 5-10
Knox M	5½x5½	Downey	1:01 1-10
Knox	5 x4¾	Belcher	1:02 1-10

Event 5, stock chassis, 451 to 600 cubic inches, standing start—

Buick 16 B	4½x5	Chevrolet	1:01 6-10
Knox R	5 x4¾	Belcher	1:02 9-10

Event 6, stock chassis, 301 to 450 cubic inches, standing start—

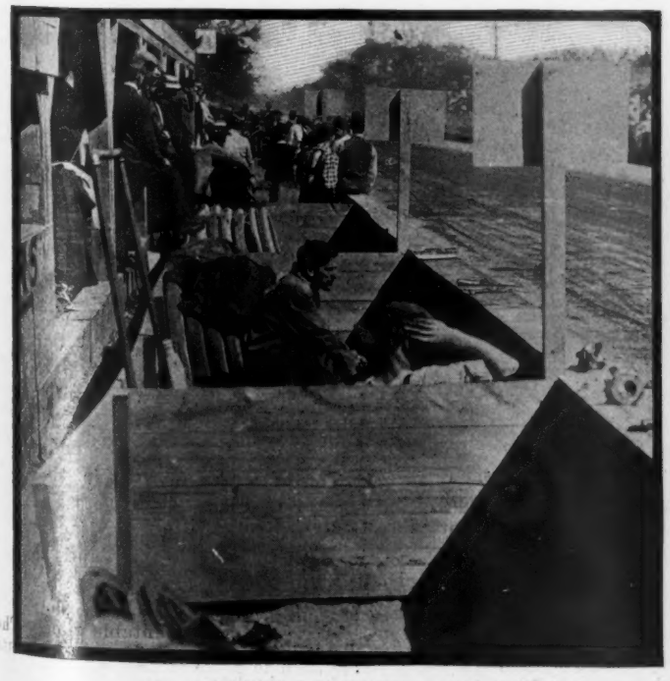
Buick 16 B	4½x5	Chevrolet	:59 5-10
Knox M	5½x5½	Downey	1:01 1-10
Knox R	5 x4¾	Belcher	1:02 1-10

Event 7, stock chassis, 161 to 230 cubic inches, flying start—

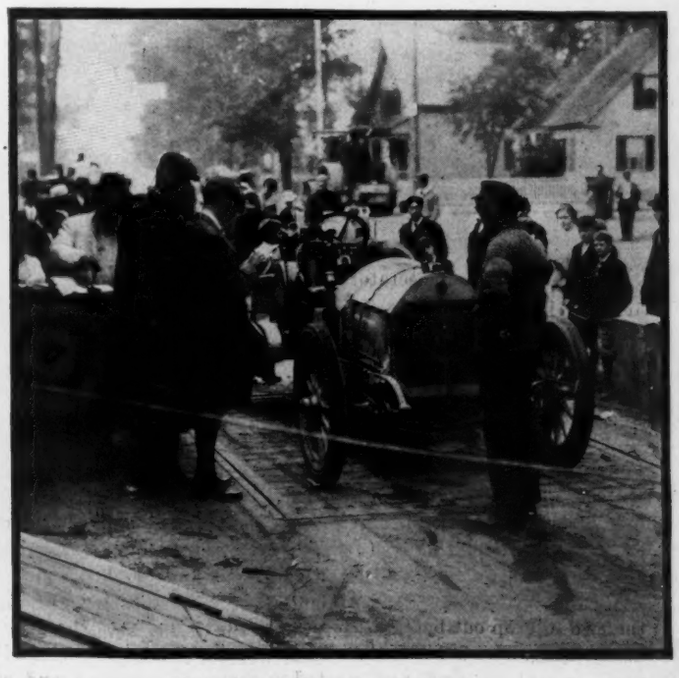
Buick	3¾x3¾	Burman	1:07 7-10
Buick	3¾x3¾	DeWitt	1:08 1-10

Event 8, free-for-all—

Benz		Oldfield	:39 9-10
Benz		Oldfield	:41
Apperson	5¾x5¾	Lytle	:44 4-10
Buick 16 B	4½x4½	Chevrolet	:49 9-10
Buick 16 B	4½x4½	Harroun	:52 2-10
Knox M	5½x5½	Isbrow	:57 7-10



VIEW FROM THE REPAIR PITS



WEIGHING IN THE RACING CARS

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The National Stock Chassis Race

THE scene of motoring activities has shifted this week to New England, where, on the Lowell circuit, the American Automobile Association has conducted its national stock chassis races. The entry list lacked that variety and representation which it deserved, many of the old racing-supporting firms not having entered and a couple of others which entered having withdrawn for various reasons. There is a feeling among many makers that the road-racing fever has run a little too high this year and that if the keen edge which racing should engender must not be lost the number of big road races in another year must be slightly reduced. The motor car maker is gradually learning that if a thing is worth even trying to do it is worth trying well and many are well tired of the old story of unpreparedness—going to the course a week in advance and not having the car well overhauled and tuned up before the time for weighing in begins. This unpreparedness is still omnipresent, as is evidenced by some of the Lowell entries that did not arrive until Sunday, the day before the triple race, and with not time enough to let the driver go over the course once in practice except at a legal 20-mile-an-hour pace. It is not surprising that cars brought to a course and prepared in this manner should drop out of the race within a lap or two and make a miserable showing. It would be better for racing as well as immeasurably better for the entrant to remain at home if he cannot come properly prepared.

ROAD racing teaches lessons to the maker who has a score or more of unsettled points about his car as, well as teaching the maker who has many weak parts. The road race can be looked upon as the supreme test, as a car that can maintain speeds of 60 miles an hour for 3 or 4 hours in succession can stand up under almost any condition. The worst criticism of the Lowell race is the lack of organization in matters pertaining to the course, the entries and general arrangements. This was partly due to the acceptance of post entries which makes it impossible to properly inspect the cars to see if they conform with stock requirements in every detail. If there is a date for entries to close they should close on that date. A national meet should be an example to all local clubs promoting runs and contests of every nature. Where entries are taken in a big road race up to the evening before the start it is certain that those cars will not be in running shape and was demonstrated this week as all of the late entries dropped out of their races in the first lap or two.

THE entries are but one phase of the lack of organization. The policing of the course was not up to standard. When soldiers are used they should be in uniform and not civilian-dress out-of-town soldiers on patrol duty and not provided with a weapon of power other than a short white badge. If the Lowell troops had been in uniform and carried their arms it would have been a much different story on the policing of the course. An example of this was furnished at Crown Point during the running of the Cobe cup and Indiana trophy races when the First Regiment of the Illinois National Guard, in uniform, kept the course absolutely clear for the 2 days, the result being that there were no accidents and both events were completed without a hitch to mar the sport.

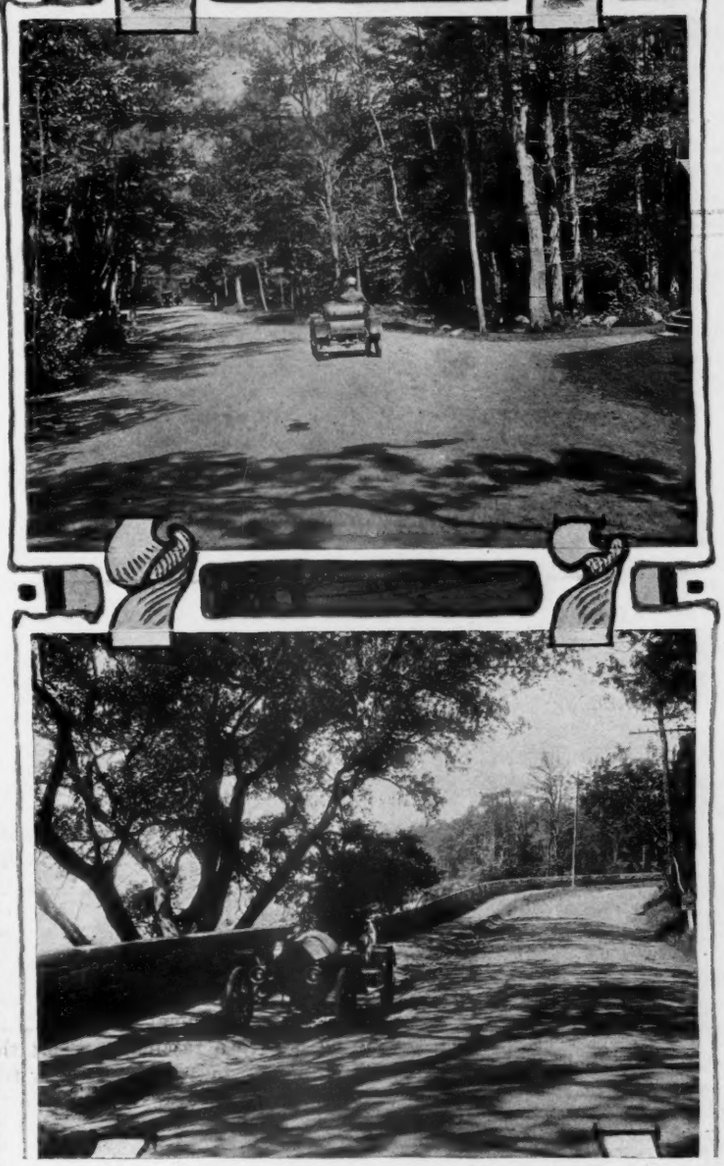
RECENT accidents on the racing path have attracted the attention of the motoring public to the drivers and their physical condition and therefore it is not at all surprising that from the Lowell meet there comes the idea of an organization of professional drivers. A driver himself suggested it and he would not have anyone eligible who has not had experience first in a factory, then as mechanician, before being eligible to drive cars in the big events. This organization could act with the officials in seeing that the drivers conducted themselves properly in a race meet, for if one of them did not charges could be preferred against him and if sustained he would be suspended. This suspension would act the same as if the A. A. A. had done it—or else the governing associations could also suspend the driver. It would put the drivers on honor. The originator of the idea did not have any drivers in mind, but points out that with the great increase in contests there will be more drivers coming to the front and among them might crop out some who would do anything to win. It also would be provided that a driver who was not in good physical condition could not drive in a race. That the whole thing could be worked out satisfactorily there is no doubt. And it all goes to show that gradually the organization of racing is being perfected. With uniform rules and classifications throughout the country; with promoters, makers and the A. A. A. working for the good of the sport and with even the drivers helping, it would seem as if the future was bright indeed. The point raised by this racing pilot regarding the physical condition of the men who guide the racing cars is a good one and if attended to probably would tend to keep down accidents to a minimum.

THIS is a decade in which the world is being constantly disturbed by the activities of the twentieth century discoverers. The north pole has been twice-found, man has conquered the air as was effectually demonstrated by the aviators in the recent trials at Rheims, France, and the motor car makers have been making rapid strides in the standardization and perfection of their product. It is only in keeping with this modern and swift pace that the energetic French have tackled the plow in an effort to bring it up to date and great good should result from the motor plowing match, open to all nations, scheduled for the latter part of this month at Amiens. Naturally this is going to be of great interest to the agriculturalist, and particularly so in this country where the farmers are showing their progressiveness by recognizing in the motor car a helper for which they long have been seeking. There is evidence on every hand that the farmers are no longer motorphobes. The recent Glidden tour demonstrated this most effectually and reports from all parts of the United States tell of the many uses to which the residents of the rural districts put the motor car. They use it mainly for business purposes and as a rapid means of going to and returning from town, but it is noticeable that motoring is such a fascinating sport that even the farmers find time to indulge in tours and short trips through the adjacent territory. Your average countryman is nobody's fool and he readily recognizes the utility of the motor car. Now let the French prove to his satisfaction the utility of the motor plow and one more nail will be driven into the coffin of the horse. The foreigners will find that Uncle Sam is alive to the situation and that if the motor plow is the thing, then he wants it.

FINE ROADS SURROUND THE SUMMER CAPITAL

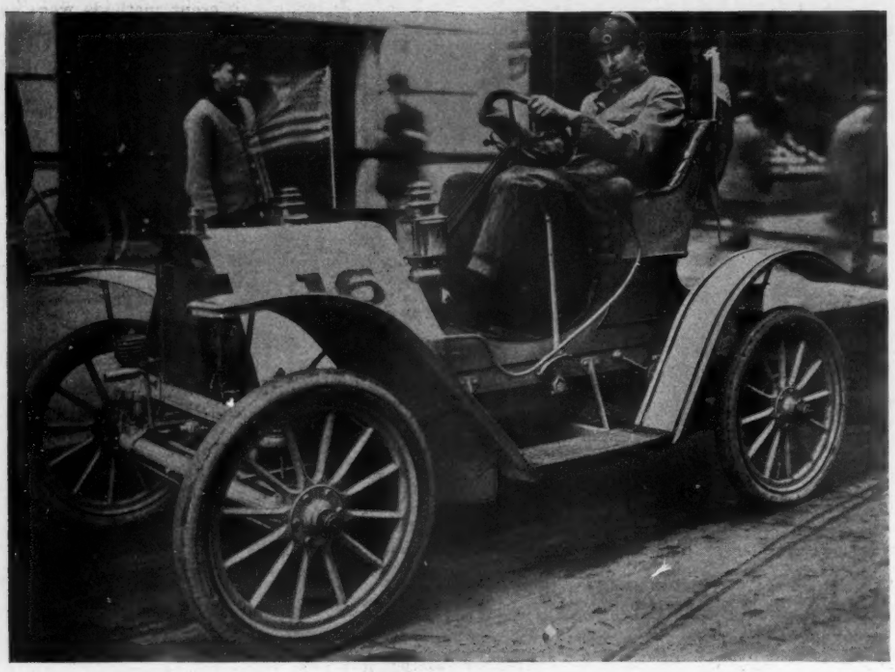
BOSTON, Mass., Sept. 5—The president's summer home is located 18 miles east of Boston on the famous north shore of Massachusetts, in Beverly, which is one of the most beautiful of the smaller New England cities. Mr. Taft, who keenly enjoys motoring, could not have picked out a more propitious location. The north shore drive, extending easterly from Beverly through Manchester by the Sea, Magnolia and old Gloucester to Cape Ann; and in the other direction through Salem, Swampscott and Lynn, where it joins Boston's wonderful park system, is almost beyond description. Miles of its course are bordered with grand old woodland and other miles follows closely the shore of Massachusetts bay. This great highway is the artery of scores of others which extend inland for miles and miles, all of finest macadam, over a wonderful rolling country dotted with beautiful lakes, through quaint villages replete with revolutionary history, and everywhere an atmosphere of calm tranquil existence, which makes one breathe way down deep and want to tell how he appreciates the wonderful surroundings, but he does not do it; he just lets the car glide along, twisting, turning, up and down with seldom half a mile of straightaway; it is just perfect, that's all, and things that are perfect cannot be described, they only can be felt. Those who never have toured in eastern New England have something in store for them that they could well afford to drive across the continent to find.

The president can leave his home in Beverly and drive up into the White mountains over roads which would make even a Frenchman gaze in open-eyed amazement; or he can skirt the shore from Salisbury beach, Massachusetts, across the southeastern corner of the state of New Hampshire and go on into the state of Maine within a stone's throw of the Atlantic for almost the entire distance. The diversity of scenery to be found everywhere within a radius of 100 to 150 miles in all directions from Beverly cannot be equalled in the United States, combined with such perfect conditions for motoring. The two views shown of the north shore drive are fair samples of the principal highways. In the view where the Cameron car stands at the side a small sign can be seen on the right hand side of the road. The sign reads, "Danger, go slowly." This is the way the Massachusetts highway commission protects the user of the roads in Massachusetts. On all the principal highways these signs appear at sharp corners or intersections of important roads, also many other notices of a similar character to acquaint the motorist with what is ahead of him. The Beverly plant of the Cameron Car Co. is within a mile of the place.



THE PRESIDENT'S SUMMER HOME AT BEVERLY AND BEAUTIFUL COUNTRY ROADS SURROUNDING IT

MINNESOTA RUNS ITS LITTLE GLIDDEN



BRUSH, THE WINNER OF THE GREGG TROPHY

MINNEAPOLIS, Minn., Sept. 4—The Little Glidden tour, the first event to be held by the Minnesota State Automobile Association, was successfully completed Tuesday, the cars numbering sixteen entrants and six non-contesting cars, covering 567.9 miles from Minneapolis to Fargo, N. D., and return. Four days were taken to make the trip and a fifth, Sunday, was spent in Fargo as the guests of the Fargo Commercial and Elks' clubs.

Of this entry list five cars—a Packard, entered by H. J. Clark, Minneapolis; Pierce, Reuben Warner, president of the St. Paul Automobile Club; Chalmers-Detroit, entered by the Barclay Auto Co., Minneapolis; Chalmers-Detroit, entered by H. S. Johnson, St. Paul, and a Brush runabout, entered by Kemp Brothers, Minneapolis—finished with perfect road scores and also passed the technical committee's final examination clean. In addition to the road and technical tests the cars were judged on an economical basis of the gasoline consumption relative to the ton mileage. The trophy winners, outside of the Brush, have not been announced as yet. It is expected a settlement will be reached at a meeting to be held Thursday.

As might be expected, this being the first run of its kind handled by the committee of the state association, there were mistakes made and there were misunderstandings of rules and other things which resulted in more or less of a mix-up among the entrants and drivers. In spite of these things, however, the tour, from a tourist's viewpoint, was a huge success.

Because of several changes in the rules made by H. S. Johnson, of the tours and contests committee, protests were registered by Reuben Warner, the Pierce entrant, and H. J. Clark, the Packard entrant, and these are now being considered by Referee Bazille, who has taken the testimony and will render a decision, it is thought, later this week. There is a quarter of a point difference between the St. Paul Chalmers, entered by John, and Clark's Packard, this difference resulting from the economy examination.

At the first day's noon control, St. Cloud, Chairman Johnson ruled that engines could be stopped while tire changes were made. This was not generally understood, so Clark, not wishing to take any chances, kept his engine running. It is claimed that this gave the advantage to Johnson's Chalmers. It is possible that Referee Bazille will order the two cars to run off another 100 miles to Taylor's Falls and return in order to decide the disputed point. The interesting feature of the run was that there were as many amateur drivers entered as professional, and the results show that these showed up as well as the dealers in the results. There were a dozen women on the trip, the whole idea at the start being to make this a state tour to be participated in by any and all who might wish to make such a trip.

The St. Paul Dispatch offered a handsome silver punch bowl, to be contested for annually, for the touring car making the best showing. H. S. Johnson and Colonel F. M. Joyce also hung up silver trophies, Johnson's going to the touring car as a permanent possession, and Joyce's being a permanent prize for the second best car. Jesse A. Gregg, of St. Paul, offered a silver pitcher for the runabout listing at less than $1,000, and this was captured with ease by the Brush runabout, entered and driven by Will Kemp, of Minneapolis. Because of the light weight of the car it did not have a show of winning the Dispatch trophy, the economy feature preventing.

In one particular the Little Glidden tour was a decided success, and this was in the amount of interest stirred up through the state. The night stops were at Alexandria, Fargo and Benson, and at these places lavish entertainment was prepared for the tour, which numbered nearly 100 persons. Band concerts were given at all the towns where stops were made, the farmers along the route decorated their homes, and in every way the tourists were made welcome. The managers of the tour, while aware that improvements could be made in the interpretation of the rules, are also confident that this tour will become an annual event in Minnesota and that it will be possible to have forty or fifty cars entered next year. This is entirely feasible when it is considered that in no other locality in the entire country is there the interest in motor cars that there is in the Twin Cities.

One of the most beneficial features of the Little Glidden was the good roads interest stirred up by the offering of the Tribune good roads trophy, a handsome piece of imported Italian bronze, which was given to the board of county commissioners of the county which afforded the best 10-mile stretch of roads for the tourists. Traverse county won this trophy, which is now being exhibited at the Traverse county exhibit at the big Minnesota state fair. Work was done in many of the eighteen counties through which the tour passed. Grass was cut away from the roads, bad places filled,

REPORT OF OFFICIALS IN MINNESOTA'S LITTLE GLIDDEN

Name of Car	Entrant	Economy Results Ton mileage	Final Standing — Road Penalty	Tech. Penalty	Total
Pierce-Arrow	Reuben Warner	21.41	Perfect	Perfect	Perfect
Packard	H. J. Clark	23.08	Perfect	Perfect	Perfect
Chalmers-Detroit	Barclay	19.42	Perfect	Perfect	Perfect
Chalmers-Detroit	H. S. Johnson	23.32	Perfect	Perfect	Perfect
Brush	Kemp	21.41	Perfect	Perfect	Perfect
Apperson	Arthur Bazille	16.89	.6	Perfect	.6
Ford	G. Dorr	16.08	.6	Perfect	.6
Cadillac	Rud Stensrud	Not taken	4.1	.....	4.1
Oldsmobile	H. S. Johnson	Not taken	7.2	15.0	22.2
Ford	A. Hanson	26.79	.2	45.0	45.2
Oldsmobile	F. E. Murphy	Not taken	44.7	.....	44.7
Lexington	H. Haynes	25.57	1.3	45.0	46.3
Hupmobile	Starr	18.27	9.3	64.3	74.6
Franklin	T. Wetmore	18.32	.....	.....	.....

bridges and culvert approaches were filled in, and in some places gravel and sand were hauled many miles in dressing up the roads. The Minneapolis Tribune has established a good roads department, and the offering of the good roads trophy in the Little Glidden is but one of many things which will be done to further the good roads movement in the state.

MUNSEY USING NEW RULES

Washington, D. C., Sept. 4—The Munsey reliability contest from Washington to Boston and return, September 21-29, will be run under the 1910 rules formulated by the American Automobile Association, and which will have their first tryout in this event. Permission to use these new rules was granted the promoters of the Munsey tour yesterday, and the announcement that these will be used in this important touring event has attracted widespread attention. Several radical changes are made in these rules from those that obtained in this year's Glidden tour, chief of which is that a fixed penalization schedule is provided. Every possible contingency has been cared for in the new rules and they are most comprehensive. Another important phase is that the competing cars are now listed in divisions instead of classes, and run from division 1 for cars costing $850 and under to division No. 6 for cars listing at $4,001 and over. The rules also provide that cars in divisions 4, 5 and 6 shall maintain an average speed of 20 miles an hour, those in divisions 2 and 3 will do 18 miles an hour, while those in division 1 will be expected to make 16 miles per hour. The cars will be started at 1-minute intervals, the 16-mile an hour cars starting first, followed by the 18-mile cars and then the 20-mile cars. Handsome trophies will be given to the winner of each division, and in addition there will be a grand sweepstakes prize to the car in any division making the best mechanical and road score. In addition to these prizes the entrance money will be divided among the winning drivers in the six divisions. Thirty-one cars, embracing twenty-six different makes, have been entered. The latest additions to the entry list include a Renault, entered by L. H. Shaab, of Baltimore, and a Hupmobile, by the Hupp Motor Car Co., Detroit.

SMITHS OUT OF OLD WORKS

Lansing, Mich., Sept. 5—Frederick L. Smith, vice-president and general manager of the Olds Motor Works, and his brother, Angus Smith, secretary-treasurer of the same company, have resigned, and Bentley J. Mead, general sales manager for the General Motors Co., which recently acquired the plant, becomes secretary and general manager. It is understood that the Smiths are interested in the organization of a new company to be promoted by Ralph R. Owen, who has resigned as factory manager of the Olds Works, although they will have no active part in the management of the proposed company. While the Smiths will not discuss the proposed company's affairs, it is understood a factory probably will be erected in Detroit.

FIFTY CARS EXPECTED TO ENTER

Kansas City, Mo., Sept. 6—While the entry list for the annual tour of the Automobile Club of Kansas City does not close until September 15, there are already twenty entries in, assuring the success of the tour. These entries include two Ramblers, a Franklin, Royal Tourist, Pennsylvania, American Simplex, Overland, Brush, Jackson, Marmon, Mitchell, Reo, Kisselkar, Velie, De Tamble, Pope-Hartford, Chalmers-Detroit and Ohio. The indications are that the tour will carry fifty cars when it starts from here September 20. The Maxwell scout car, supplementing the work of the pathfinders, returned last Saturday from a trip over the route. The scouts gave added assurance that the tourists later on will have easy sailing. The roads on the route are in excellent condition and the towns are preparing to accord a hearty reception to the cup chasers when they pass through. There are six prizes to be competed for in the tour. The Kansas City Star is to give a massive cup as first prize in class A, the dealers' class, and a grandfather's clock standing 9 feet high for the private owners in class B.

PRACTICAL BOOST FOR ROADS

Columbus, O., Sept. 4—A lasting impetus was given the agitation for good roads throughout the state of Ohio by the good roads day, held Tuesday at the grounds of the Ohio state fair. Hundreds of farmers and motorists from practically every section of the state attended the exercises and demonstrations, and the enthusiasm shown was such as to give the officers of the Ohio Good Roads Federation hope as to practical results to be accomplished the coming year. The feature of the day was a practical demonstration of road-building on the fair grounds. Two different methods were used and both were illustrated and demonstrated at length. One was a road of tarvia covering and the other water-bound macadam. Another feature was a parade of all road-building machinery, in which more than 100 steam rollers, scrapers, graders and other implements were hauled. The arrangements for the meeting were under the charge of M. M. Maxwell, secretary of the Ohio Good Roads Federation. County engineers from all parts of the state attended. The events of the day showed the work being done by motor clubs and by individual effort. Many motorists were in attendance and they pledged their support to the movement. Similar days will be a feature of many of the county fairs to be held in the Buckeye State. The Chamber of Commerce and Governor Harmon of Ohio has extended an invitation to the American Roadmakers' Association to meet in Columbus in October. Secretary E. L. Powers of the association was in the Buckeye capital recently.

WILL IMPROVE PLANK ROAD

Milwaukee, Wis., Sept. 5—The Milwaukee county board has awarded contracts for improving the Janesville plank road, an ancient trunk thoroughfare and favorite road for motorists on tours, at a cost of $10,000. The road will be entirely rebuilt for more than 1 mile, and resurfaced with granite screenings. A dust-laying and binding material will then be added. Several other trunk roads will be reconstructed as soon as the Janesville highway is completed. The work now being done is part of a general scheme of improving Milwaukee county roads and building a huge system of interconnecting highways, similar to that being arranged in the city of Milwaukee.

FRED SWITZER IN CHALMERS-DETROIT IN LITTLE GLIDDEN TOUR

GERMANY REPORTS ITS MOTOR STRENGTH

BERLIN, Aug. 24—According to the official or government records there were 39,475 motor cars to carry passengers in operation or licensed in the German empire on January 1, 1909. On the same day in 1908 there were only 34,244 cars recorded officially, and in January, 1907, the total was 25,815. Thus, from 1907 to 1908 there was an increase of 8,996 cars and from 1908 to 1909 the increase was only 5,705. In percentage it means a drop of from 33.3 to 15.8 per cent. The number of commercial or industrial motor cars during the same 3 years increased from 1,211 in 1907 to 1,778 a year later and to 2,252 at the beginning of this year. This means an increase of 4.9 per cent from 1907 to 1908 and of 5.4 per cent from 1908 to 1909.

Special records have been kept to find out to what purposes the motor cars in Germany are used. Thus it has been found that there is a steady although not very large increase in the number of cars used by the army, navy, postoffice departments, etc. The biggest increase is shown in the table referring to the cars used for business purposes, that is, by retail and wholesale houses to carry either merchandise or persons. Taxicabs, motor buses and other motor vehicles used for passenger traffic are classed separately and show almost a doubling of their number at the beginning of this year.

The following table gives the official statistics on the first days of January, 1907, 1908 and 1909:

Pleasure cars			Commercial cars		
1907	1908	1909	1907	1908	1909
25,815	34,244	39,475	1,211	1,778	2,252

Classification of cars as to horsepower:

Cars of not more than 8-horsepower					
5,111	7,457	9,434	516	825	1,035
Cars of from 8 to 16 horsepower					
3,278	4,395	5,441	313	418	502
Cars of from 16 to 40 horsepower					
1,674	2,754	3,595	126	284	448
Cars of more than 40-horsepower					
52	65	77	2	16	19

The following shows vehicles in official service:

	Passenger cars			Commercial cars		
	1907	1908	1909	1907	1908	1909
8 h. p. or less	31	37	56	11	22	34
8 to 16 h. p.	39	49	53	18	28	33
16 to 40 h. p.	31	84	123	16	49	58
40 h. p. and over	2	4	10	..	12	12
Total	103	174	242	45	111	137

The following shows vehicles used by commercial houses or other concerns, but exclusive of transportation vehicles such as motor buses and other passenger-carrying vehicles:

	Passenger			Commercial		
	1907	1908	1909	1907	1908	1909
8 h. p. or less	1,531	2,268	3,112	500	794	986
8 to 16 h. p.	667	919	1,285	291	381	458
16 to 40 h. p.	277	520	751	98	221	371
40 h. p. & over	7	13	8	1	3	4
Total	2,482	3,720	5,156	890	1,399	1,819

The following shows vehicles used in the land and forest departments:

	Passenger			Commercial		
	1907	1908	1909	1907	1908	1909
8 h. p. or less	34	51	60	2	2	10
8 to 16 h. p.	21	19	32	3	3	5
16 to 40 h. p.	8	10	13	3	4	8
40 h. p or over	..	..	1	..	..	1
Total	63	80	106	8	9	24

The following shows passenger cars, such as motor buses and taxicabs in public use:

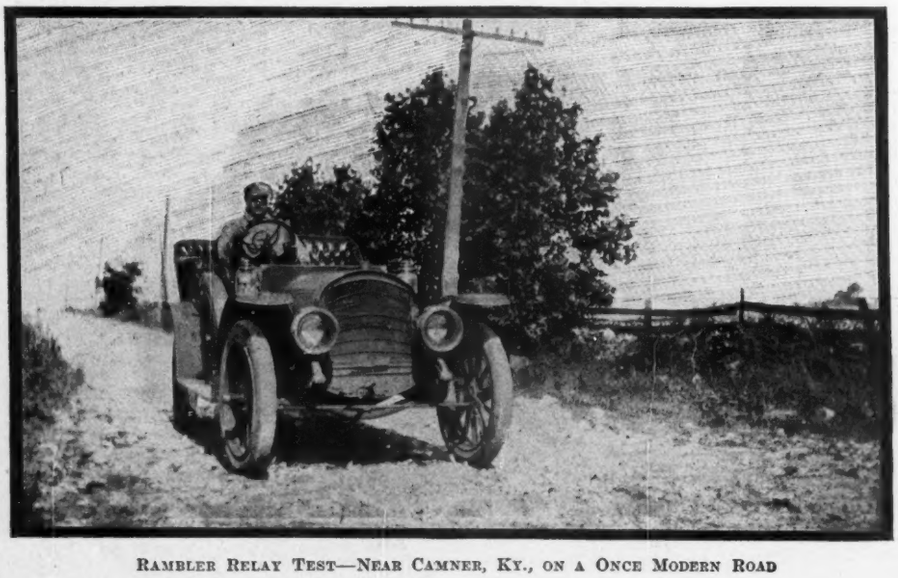
	1907	1908	1909
Up to 8 h. p.	319	501	675
8 to 16 h. p.	735	1,003	1,348
16 to 40 h. p.	141	230	317
40 h. p. or more	2	...	...
Total	1,197	1,734	2,340

The following shows cars used by doctors, land surveyors, et al.:

	1907	1908	1909
Up to 8 h. p.	963	1,539	1,990
8 to 16 h. p.	167	242	285
16 to 40 h. p.	20	49	58
40 h. p. and over	....	2	....
Total	1,150	1,832	2,333

The following shows cars used for pleasure and sport:

	1907	1908	1909
Up to 8 h. p.	2,233	3,061	3,541
8 to 16 h. p.	1,649	2,163	2,438
16 to 40 h. p.	1,197	1,861	2,333
40 h. p. and over	41	46	58
Total	5,120	7,131	8,370



RAMBLER RELAY TEST—NEAR CAMNER, KY., ON A ONCE MODERN ROAD

Dealing only with Berlin the following figures are given:

PASSENGER CARS

	1907	1908	1909
	1,976	1,904	2,271
Cars up to 8 h. p.	532	545	623
8 to 16 h. p.	626	628	769
16 to 40 h. p.	286	332	423
40 h. p. and over	5	5	10
Total	1,449	1,510	1,825

COMMERCIAL CARS

	1907	1908	1909
	432	510	592
Cars up to 8 h. p.	232	339	385
8 to 16 h. p.	64	85	101
16 to 40 h. p.	5	20	30
40 h. p. and over	....	....	....
Total	301	444	516

VEHICLES USED BY BUSINESS HOUSES

PASSENGER CARS

	1907	1908	1909
Up to 8 h. p.	28	49	31
8 to 16 h. p.	13	18	22
16 to 40 h. p.	16	14	17
40 h. p. and over	....	....	....
Total	57	81	70

CARS FOR GOODS CARRYING

	1907	1908	1909
Up to 8 h. p.	231	337	372
8 to 16 h. p.	62	82	95
16 to 40 h. p.	5	20	30
40 h. p. and over	....	....	....
Total	298	439	497

VEHICLES USED TO CARRY PASSENGERS —TAXICABS AND BUSES

	1907	1908	1909
Up to 8 h. p.	174	186	239
8 to 16 h. p.	340	364	497
16 to 40 h. p.	51	103	135
40 h. p. and over	....	....	....
Total	565	653	871

WINTER TESTS IN FRANCE

Paris, Aug. 25—L'Auto has promoted for this coming winter a new event for France. It will be a small car reliability trial, open to stock voiturettes. Each maker will be allowed to enter three cars, all of which much be equipped with mud guards, steps, windshield or protectors, tops, lanterns and in fact all the accessories which a small car would carry when driving in winter. Only two persons will be allowed on each car, the driver and the observer. The driver must also be a mechanic, as he cannot secure outside assistance. With the exception of stops due to tire troubles, all others will cause the car to lose points. The total distance which the contestants will have to cover will probably be about 1,850 miles, and there will be probably twelve stages. Although no date is yet set for the event, no rules and regulations definitely prepared—the above being just a few explanatory notes published by l'Auto—already Sizaire & Naudin have mailed the promoters their entry for three cars. L'Auto announces that its sixth annual voiturette race will be run August 21, 1910, and that the rules and regulations will be published within a fortnight. This is the earliest announcement made for any race to be run in Europe in 1910.

PARISIAN TAKES A CENSUS

Paris, Aug. 19—Several months ago the French motor car journal, La Vie Automobile, mailed about 4,600 letters to its French subscribers asking them, if owners, to state what they thought of their car or

cars. In a recent issue of the Paris weekly it is stated that answers were received from the majority of subscribers and that the criticism thus expressed embraces 3,469 cars, of which thirty were special-built or not standard cars. Ten different countries are represented among the 3,469 cars, France of course leading with 3,124 cars, Belgium being second with 114, Germany third with seventy-one, Italy fourth with sixty-four, the United States fifth with forty-seven. Then comes England with thirty-two, Switzerland with seven, Austria with five, Spain with four and Russia with one. The American-made cars, numbering forty-seven, consisted of four Cadillacs, twelve Fords, six Franklins, two Loziers, eleven Packards, three Pierce-Arrows, two Stearns, two Thomas, two Whites and three Wintons. The Renault occupied the top of the list with 385 to its credit, Peugeot followed with 331, then came de Dion-Bouton with 282, Panhard with 233; Mors, 179; Bayard-Clement, 171; Berliet, 138; Darracq, 132; Lorraine-Dietrich, 129; Rochet-Schneider, 96; Brasier, 81; Unic, 74; Delaunay-Belleville, 71.

PLOWING WITH MOTORS

Paris, Aug. 23—Agriculturalists will have an opportunity of seeing how plowing can be done without the aid of horses or oxen at an exhibition to be held at Amiens, France, on September 24. The occasion is an international competition and motor congress intended to develop the use of the internal combustion motor in agricultural pursuits. In the motor plowing match each of the competitors will be given a piece of land on which to operate, the classification being established on the manner in which the plowing is done, the cost per acre, the time necessary to bring the machine to the field and put into operation, the number of men required, the facility with which work can be done on varied land, and the possibility of using the motor for other work on the farm. This is the second occasion on which a plowing competition has been held in France, the first being last year at Bourges. In order to encourage the use of motors on farms it has been decided that a series of exhibitions, competitions and congresses shall be held, a different center of France being selected each year. Up to the present French constructors have not paid very close attention to the development of very simple motors for use on farms, or to motor-driven or steam plows.

GERMAN TEST POSTPONED

Berlin, Aug. 25—The small car trials promoted by the Kaiserlicher Automobil Club and which were scheduled to take place August 30 to September 2, have been postponed to September 27-30 because the government authorities of Saxony sent word to the promoters that they would not permit the use of the roads on Saxon territory until all the crops had been taken in.

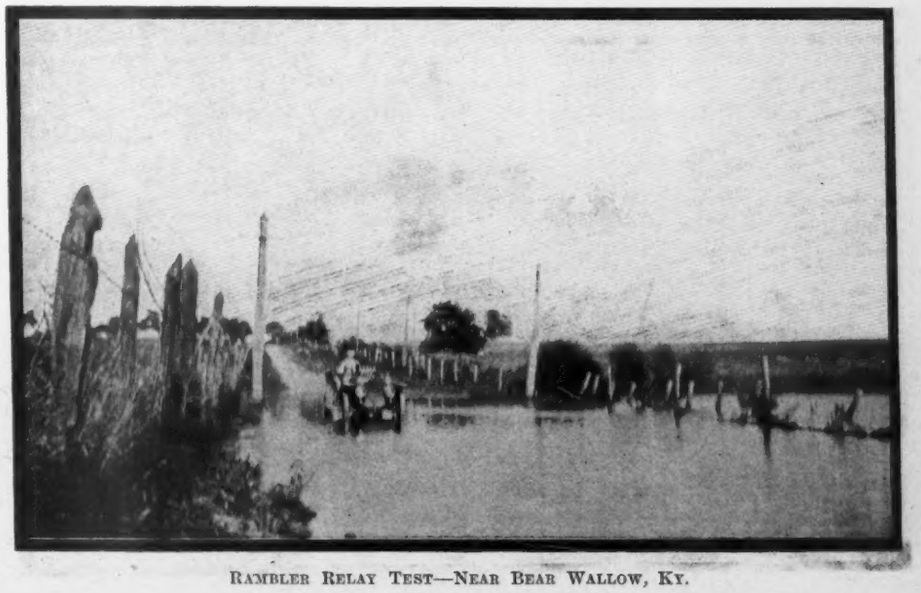
New Ramblers Tried Out By Relay Test Scheme

Kenosha, Wis., Sept. 5—Two 1910 model Fifty-five Ramblers, produced in the Kenosha plant of Thomas B. Jeffery & Co., have returned to the factory after completing test trips aggregating 5,000 miles each, in which the principal Rambler dealers throughout the east, central south and middle west participated on the relay plan. This is claimed to be the first time any manufacturer has placed his first cars in the hands of dealers to test them out for themselves. Each dealer in each territory received the test car from the dealer in the preceding territory and ran it as long as he chose, over the most difficult roads in his locality, with the object of determining for the benefit of the maker any weaknesses which might otherwise require months to detect and might possibly be overlooked in the Rambler factory tests. The route of the first car was from Chicago to Indianapolis, by way of South Bend, thence to Louisville, Nashville, St. Louis, Kansas City, Omaha and Chicago, returning to the factory in the hands of J. T. Stewart, of the Coit Automobile Co., of Omaha. The second car, which left the factory in charge of the Rambler branch managers, was driven to Cleveland by way of Chicago and Toledo, by G. S. Patterson of the Cleveland branch. This car traversed the east, passing through Pittsburg, Harrisburg, Philadelphia, New York, Hartford, Boston, Albany and Buffalo, returning to the factory by way of Cleveland and Chicago.

Both cars returned to the factory in perfect condition, having overcome road conditions some of which had seldom previously been encountered by a motor car. The trip of the first car from Kenosha to Chicago, South Bend, Logansport and Indianapolis, was made with a factory man at the wheel, where it was turned over to the first dealer—Prince Wells, of Louisville, Ky. Wells drove the car from Indianapolis to Louisville and from there over an old pre-war time stage route to Nashville. This was the most difficult passage of the 5,000 miles covered by this car. At Louisville the Kingman St. Louis Implement Co. took the car by way of French Lick to St. Louis, where the Rambler Automobile Co., of Kansas City, received it. Then, by a circuitous route, various dealers piloted it through Missouri to Kansas City. In the Missouri valley, because of the floods, the roads were almost impassable, the car being detained 13½ hours in one mud hole before it got under way again.

At Kansas City the Coit Automobile Co. of Omaha took the car, driving it to Lincoln. At Lincoln E. E. Mockett began a record-breaking run to Omaha, making 66 miles in 1 hour 59 minutes, establishing a new record for the trip—the previous time being 2 hours 35 minutes. J. T. Stewart drove the car from Omaha to Chicago and thence to Kenosha. This model will be shipped to Kansas City to participate in the Kansas City Star endurance run in September.

The eastern test trip began at Kenosha, when the branch manager of Thomas B. Jeffery & Co. representing New York, San Francisco, Boston, Milwaukee and Cleveland, took the car over the first leg of its journey. At Chicago it was turned over to Manager Patterson of Cleveland, who went east by way of Cleveland. L. G. Martin, of Pittsburg, there took charge of the car, going by way of Youngstown to Pittsburg in 7 hours without difficulty. At Pittsburg the New York branch took charge of the car, routing it through Harrisburg to Philadelphia. From New York the Boston representative received the test car, and it was relayed up through New England by way of Providence and on to Boston and thence to Albany. Here it was met by the Rochester representative and taken through to Buffalo, where it was again delivered to the Cleveland man who, in turn, started it on the return trip to the factory.



RAMBLER RELAY TEST—NEAR BEAR WALLOW, KY.

LOZIER SIX WINS TANFORAN 300-MILE RACE

SAN FRANCISCO, CAL., Sept. 6—Special telegram—To a Lozier car of the Briarcliff type went the first long-distance track race ever held in this city, the victory being scored yesterday at Tanforan when the Lozier completed the 300 miles of the race for the Hotel St. Francis trophy in 6 hours 4 minutes 3⅕ seconds. A Thomas completed 259 miles, a Packard 244, a Stearns 232 and a Stevens-Duryea 159. Except for the first 19 miles, during which the Stevens-Duryea big six cut out a very fast pace, there never was a question of the ultimate victory of the Lozier, barring, of course, any accident. The four other cars in the race finished in the order indicated above. All of them had more or less trouble during the long grind, and most of their losses were due to time spent in the paddock for tires or other repairs.

It was 117 miles before the Lozier, which was the only late model in the race, went off the track for the first time, and that was to change the right front tire, which had been worn down by the hard work that it had been compelled to do in resisting the turns. During all those 117 miles the car ran like a top. It was beautifully handled by Harry Michener.

The race, considering the fact that it was northern California's first attempt at a long track contest, and the unusual reluctance of the local dealers to take part, was declared by old-time racegoers to be a very creditable beginning. In spite of the small field of cars, there were constant brushes that brought the people pressing against the railings to watch the fight.

The Lozier had a bore and stroke of 5¼ by 5¼ and was driven by Harry Michener. Al Shuler drove the Thomas, which has a 5½-inch square motor; Tom Sawyer and Jim Bowman drove the 5⅜ by 5⅞ Stearns; Howard Warner handled the 5 by 5½-inch Packard, and Clifford Onthank piloted the Stevens.

The Hotel St. Francis $2,500 trophy is one of the finest specimens of the silversmith's art ever produced on the Pacific coast. The trophy, which is 3½ feet high, stands on a base of Pennsylvania mottled marble, around the bottom of which are four plates, on one of which is engraved in block letters in relief the inscription, "Golden West Grand Prize Race," and on the other three plates are engraved the conditions of the race. In the middle of the base are the figures of four racing cars, heavily etched on a band of silver, representing a circular track. Above the figures of the racing cars is a succession of draped wreaths, surmounted by a large silver column, around the bottom of which are four reproductions of the coat of arms of the Hotel St. Francis. Immediately above this is a model in miniature of the Hotel St. Francis standing out in bold relief. Near the top of the silver column is a drapery of wreaths and bowknots, suspended from which are four state seals, representing the states of California, Nevada, Oregon and Washington, comprising the territory of the Golden West. Above this, and surrounding the column, are four winged wheels, and surmounting the column is a figure standing on a winged wheel, throwing a wreath, representing victory and speed.

The Tanforan race was the first held here under the management of an association organized for the specific purpose of giving a race meet. This organization is the California Motor Racing Association, and it is stated to have been composed of a number of moneyed men—owners of high class motor cars—who in a general way were interested in giving San Francisco an exhibition of what cars of the highest grade can do on a track.

SPEED TRIALS AT WILDWOOD

Wildwood, N. J., Sept. 6—Although no speed records were broken at the maiden meet of the youthful North Wildwood Automobile Club, this afternoon, the affair was so well managed that the 25,000 spectators who lined both sides of the course and at times fairly overran the finish were sent to their suppers well pleased at the sport furnished. Twenty-eight separate dashes over the fast mile course were finished in 2 hours 25 minutes. The event of the day, the mile time trials, furnished an exhibition of sportsmanship which, while it deprived Joe Parkin of a sure first place, stamped him as the real thing among drivers. Parkin had sent his own car, the 40-50 Parkin, over the course against a stiff head wind in :54⅘, as against the :55 of Willie Haupt's Berliet 70. When the officials gave the motor cyclists the privilege of running with the wind in their second trials—with a resultant 5-second benefit—it was suggested that Haupt and Parkin do likewise. It lost Joe first prize, for while Willie reduced his time on the second try to :51⅘, Parkin could do no better than :52⅘, due mainly to a skid in negotiating the curve at Central avenue before reaching the starting tape. Parkin had the satisfaction of badly beating Haupt in the free-for-all, however, the Parkin being fully 40 yards ahead of the Berliet at the finish in the fast time of :55⅕. The Parkin and the Berliet were the only under-the-minute cars on hand, the Lowell carnival having gathered in practically every fast car in the east. Summaries:

1-mile, $1,250 and under cars—R. A. Jackson, 20-horsepower Mitchell, won; H. F. Hunter, 30-horsepower Overland, second; E. S. Byam, 20-horsepower Ford, third. Time, 1:18.

1-mile, $1,251 to $2,000 cars—Frank Paxson, 30-horsepower Cadillac, won; Cherie Borie, 40-horsepower Mitchell, second; Joseph Parkin, 30-horsepower Mitchell, third. Time, 1:10.

1-mile, $4,001 to $5,000 cars—Joseph Parkin, 30-horsepower Packard, won; George Wesley, 30-horsepower Packard, second. Time, 1:05 3-5.

1-mile free-for-all—Joseph Parkin, 40-50-horsepower Parkin, won; Willie Haupt, 70-horsepower Berliet, second; Frank Paxson, 30-horsepower Cadillac, third. Time, :55 1-5.

1-mile consolation race—J. W. Beck, 30-horsepower Packard, won; Joseph Parkin, 30-horsepower Mitchell, second; E. S. Byam, 20-horsepower Ford, third. Time, 1:23.

1-mile special event—R. H. Nimmo, 30-horsepower Peerless, won; J. W. Ely, 48-horsepower Acme, second; J. W. Beck, 30-horsepower Packard, third. Time, 1:08.

1-mile match race—J. L. Brown, 40-horsepower Pullman, won; H. F. Hunter, 30-horsepower Overland, second. Time, 1:11 4-5.

1-mile time trials—Willie Haupt, 70-horsepower Berliet, won; time, :55 and :51 1-5. Joseph Parkin, 40-50-horsepower Parkin, second; time, :54 4-5 and :52 4-5. Joseph Parkin, 30-horsepower Packard, third; time, 1:00. R. H. Nimmo, 30-horsepower Peerless, fourth; time, 1:03. Frank Paxson, 30-horsepower Cadillac, fifth; time, 1:05. J. L. Fritz, 30-horsepower Packard, sixth; time, 1:06 2-5.

PROGRESS OF THE RANGER

Chicago, Sept. 7—Only the illness of Private Malcolm E. Parrott, Sixteenth Regiment, N. Y. N. G., prevented the Mitchell Ranger, which is making a transcontinental trip from New York to San Francisco, bearing military dispatches from Major-General Leonard A. Wood to Major-General John F. Weston, from continuing its flight across the country hours ahead of the original schedule. Private Parrott was taken ill at Julesburg, Colo., and an attending physician cautioned him to give up the trip on account of threatening appendicitis. Private Parrott wired to headquarters to send on relief, but before his would-be successor arrived at Julesburg he had recovered sufficiently to resume the journey. The object of the trip, which was inaugurated on August 19, when the Ranger with Private Parrott, Lieutenant B. B. Rosenthal, a veteran of the Spanish-American war, and Driver Frank X. Zirbies as passengers started on the long gruelling test across country, is to test the practical use of the modern motor car for purposes of warfare in this country. The first leg of the trip from New York to Chicago was covered in the actual running time of 55 hours without any effort at record-breaking. The machine arrived in Chicago 48 hours ahead of its official schedule and tarried here over night, resuming the journey westward on August 25. In order to arrive on schedule time, the machine must report at the Presidio in San Francisco on September 16. The delay of 5 days at Julesburg on account of the illness of Private Parrott will not necessarily prevent the men from reaching their destination on scheduled time, as they will double their running time until they catch up, according to information received from the tourists. Twelve days had elapsed in traveling from New York to Julesburg. The heavy rains the week following the departure from Chicago made the going heavy, particularly through the Iowa gumbo. Despite the antagonistic elements the crew reached Julesburg 25 hours ahead of schedule, the trip being made entirely by daylight. Of course, the worst part of the trip is yet to come, as the desert is being encountered at present and, according to reports, the trip is anything but a picnic. However, the Mitchell crew is confident that it will reach 'Frisco on time.

CARS SHOWN AT MINNESOTA STATE FAIR

MINNEAPOLIS, Minn., Sept. 6.—Minneapolis as a motor center is showing up strong this week, when there is being held a motor car show during the week in the $250,000 grandstand building, just completed by the state fair management. Holding a motor show in a grandstand sounds queer, yet the basement of this huge new concrete structure affords an ideal spot for such an exhibition. The show room is 300 by 150 with one entire side composed of huge windows. Manager Walter Wilmot has outdone himself and the decorative schemes which he has worked out in purple and white is one of the most elaborate ever seen at a motor exhibition. The cars to be exhibited are as follows: American, Pope-Toledo, Reo, Holsman, Chalmers-Detroit, Hudson, Thomas, Velie, Elmore, Inter-State, Pullman, Winton, Peerless, White steamer, Cadillac, Rapid truck, Black, Columbus electric, Frayer-Miller truck, Mora, Halladay, Mitchell, Chase trucks, Minneapolis motor truck, Regal, Midland, Pennsylvania, Richmond, Jackson, Maxwell, Hupmobile, Brush, Schacht, Detroit electric, Wilcox, McIntyre and various accessories.

Hundreds of thousands of people visit this state fair each year, and the motor car dealers, tire and accessory people all realize the splendid opportunities presented at an exhibition of this kind for displaying their wares. One of the 6 days of fair week, Saturday, has been designated motor car day and there will be special features for this day calculated to interest the motoring public. In the afternoon sanctioned events on the Hamline track will be run off under the directions of the St. Paul and Minneapolis Automobile Club officials. De Palma will again appear to defend his record and to set up a new one if possible in his Fiat Cyclone. Christie will be seen in his front driver. George Kilpatrick will drive his 120-horsepower Hotchkiss, and Burman and Strang of the Buick racing team will also be present. Each of these racing stars will be given two trials at the world's record, and as there is a $200 cash bonus in case the record is lowered, some fast driving will be seen. There will also be a 10-mile free-for-all in which these five luminaries will start. In addition to these events there will be two and possibly more events arranged for local drivers who are anxious to compete.

At 7:30 in the evening there will be a mammoth motor car parade in front of the big grand stand, the cars encircling the ½-mile and 1-mile tracks under scores of powerful searchlights, flaming arcs and red and green fires. A hundred entries at $1 each have been received and there are liberal cash prizes in each of the six classes into which the cars will be divided. At the conclusion of the parade the winners in the various classes will again pass in review of the judges for a grand sweepstakes prize of $100 in cash. Every kind and style of decoration will be seen and there is intense interest in this crowning effort of the day's entertainment.

MILWAUKEE BILLS A 24

Milwaukee, Wis., Sept. 6—The Milwaukee Automobile Club will hold its fourth annual 2-day race meet and its third annual 24-hour race at State Fair park, Milwaukee, Wis., on Friday and Saturday, September 24 and 25. Lee A. Dearholt, chairman of the racing board of the Milwaukee A. C., Milwaukee, is receiving entries for the long grind as well as for the shorter events preceding the start of the 24-hour on Friday and following the finish on Saturday. The club has hung up three money prizes for the 24-hour —$500 for first, $200 for second and $100 for third place. It is expected that Milwaukee business men and manufacturers will hang up several valuable trophies in addition. The short distance events have not been arranged and the club is not ready to announce the prizes. A unit lighting system of 200 300-candle power lights, placed 20 feet apart around the 1-mile course, and the invention of members of the M. A. C. will be used for illumination. This system is entirely new and is attracting much attention. Wisconsin militia will patrol the course and the strictest regulations will obtain.

SIMPLEX WINS BIG RACE

(Continued from page 8.)

Renault, Parker and Burman ran the lap in a little over 12 minutes.

Lap 19—All the cars were running about a minute to the lap slower than in the first ten laps, not one going 11 minutes. De Palma gained 34 seconds on the leader and Burman was only 5 minutes back of Poole, who was running in fourth place.

Lap 20—This lap saw de Palma reach the climax of his gallant up-hill fight and when it ended he was but 10 seconds behind Alco and almost on the threshold of second place with ten laps to go. Robertson was only 2 minutes ahead of him and when de Palma rushed past he was cheered to the echo. The great struggle of the day seemed to be at hand and a fresh start was given. The Poole-Burman-Parker order remained unchanged.

Lap 21—The sweets of victory were short and a slow lap in 13:16 put de Palma nearly 2 minutes back. Burman gained a couple of minutes on Poole. The Renault had a slow lap putting on a tire on the back stretch and stopping to take on a spare one at the pit and replenishing with oil. The Shaw-Knox and the Lozier made the lap in a little over 12 seconds.

Lap 22—Robertson and Grant, learning of de Palma's encroachment on their one, two position, were opening up to the limit and as a result the lap was wonderfully close, among them: Robertson, 11:15; Grant, 11:09, and de Palma 11:16. It was a battle royal. Burman and Poole caught the fever and did laps in 11:30 and 11:40 respectively. But Parker in an up-hill struggle being 18 minutes back of Poole, beat them all, cutting the mark to 11:05. This lap marked the start of a new angle, namely, the climbing of Parker by steady and consistent running.

Lap 23—At this juncture Robertson's crown, which had worn continuously from the tenth lap when he headed Lytle off, looked in grave danger as the Alco was only 52 seconds behind him, Grant having gained when Robertson stopped in the twentieth lap for oil, gasoline and water and changed some spark plugs. De Palma was third, 2 minutes back. Burman was but 30 seconds from nailing Poole and a general shaking up of positions apparently was at hand.

Laps 24, 25, 26—The great fight for first, second and third honors was entering on its final stages. In lap 24 Grant cut 5 seconds from Robertson's lead, de Palma by taking 16:28 for the lap because of valve trouble lost what appeared to be his final chance, but was still a certain third. In lap 25 Robertson had a 55-second lead. De Palma lost more than a minute but Burman gained on Poole, as did Parker. Lap 26 saw Grant gain 8 seconds on the Simplex and de Palma, going round in 11:10, gained 11 seconds on the leader. Poole stopped and lost 4 seconds to Burman and 5 to Parker, but was 5 minutes ahead of Burman and 9 over Parker.

Laps 27 and 28—This lap brought the ending to the Robertson-Grant duel. Grant had trailed second for seventeen laps, never more than 5 minutes back, but in this circuit the light shone and by Robertson having to stop for supplies and spark plugs Grant landed in first place, his time being 309:59 against 313:22 of Robertson, or a clean lead of 3 minutes 24 seconds, with but three more laps to go. As Grant flashed by he was given his signals and he let out as he departed down the stretch. But joys changed into mourning, Grant's glory was like Lytle's—very short lived. He was not gone 6 minutees carrying his new first place laurels when word came from the back stretch that he had thrown a tire and broken a driving chain, which put him out and he never came around again.

The finish—With Grant out the cup of sorrow for the under dog reached overflowing. The last three laps were a Robertson procession. De Palma was a good second until the last lap, when he disappeared down the stretch but never finished, no tidings coming of his trouble. This put Poole, who was 21 minutes back, up into second place, Parker 9 minutes later was launched into third, Burman was fourth by 3 minutes and the Renault fifth, 13 minutes in rear of Burman.

The Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

THE STOCK CAR STATUS

OTTAWA, ILL.—Editor Motor Age—I was much interested in the "Stock Car Farce" article by Mr. Smyth, and a reply by Reader. I must say that many like myself agree with Mr. Smyth. If Reader will read the article over, he will note that Mr. Smyth does not, as he alleges, doubt the existence of a stock car, but regrets the fact that so few of them appeared in the race. He seems to think—strange as it may seem to Reader and perhaps others interested in the races—that a stock car should be one such as can be obtained by anyone from an agent without being altered or changed in any particular other than by the omission of accessories. Few if any were entered in the stock car races which would come under this simple requirement. I understand that the pieces of the seven other special Buicks, or some of them, were still on the floor at the time of the races. A car that "will be" stock is not necessarily a stock car. Cars that are equipped with special axles, special rims, special pistons, special exhaust ports, special compression plugs, etc., certainly are not strictly stock. Possibly Mr. Smyth does not find fault with the manufacturers for taking advantage of a very liberal definition of the word stock, but rather at the liberality of the interpretation.—Ernest Anderson.

HYDROMETER TEST NOT ENOUGH

Bennet, Neb.—Editor Motor Age—Will Motor Age kindly explain to me the qualities of gasoline for motor car work, as to whether a high-test Baume hydrometer or low test yields the most power. My textbooks and chemistry tell me that the high test, 70 or 74, gives the best power and least carbon deposit in the cylinders. The tank wagon men and their employers say the hydrometer is not a good test and the dryness cuts no figure. Also they claim the low test gives most energy.—W. W. De Wolf.

Calorific, which signifies the thermal value of fuel, as gasoline, is almost constant in the several fractions, as served out by the octopus. Because the liquid called motor car gasoline is made up of a plurality of fractions of the distilling process rather than of some one fraction it follows that a hydrometer is incapable of determining as to the actual quality of the mixture, since the proportions of the fractions are not held to a constant value. When gasoline, as used in car work was hexane, or other fractions of substantially the same density and nearly the same volatility, the hydrometer served as a satisfactory means of determining the quality of the fuel, and resort was rarely had to any other means of establishing the quality of the same. Considering the various products of the distilling process, the hydrometer graduations are as follows:

		Specific gravity
Butane	$C_4 H_{10}$	.600
Pentane, iso	$C_5 H_{12}$	.628
Pentane, normal	$C_5 H_{12}$	.626
Hexane	$C_6 H_{14}$	.674
Hexahydrobenzine	$C_6 H_{12}$	.760
Hexahydrotoluene	$C_7 H_{12}$	.772
Heptane	$C_7 H_{16}$	.688
Octane	$C_8 H_{18}$	.719
Octane, normal	$C_8 H_{18}$	.707
Nonane, a	$C_9 H_{20}$	.740
Nonane, normal	$C_9 H_{20}$	.722
Decane	$C_{10} H_{22}$	.738
Benzine	$C_6 H_6$	.884
Toluene	$C_7 H_8$	.871
Ethyl alcohol	$C_2 H_6 O$	.797
Methyl alcohol	$C H_4 O$	.797

WANTS A SELF-STARTER

Lexington, Miss.—Editor Motor Age—Will Motor Age please say if it knows of any device that will attach to a model 32 Overland that will crank the engine? It requires great endurance to start on the magneto, and if the batteries have been exhausted, as was the case with mine recently, it is quite a problem to get the car started. I have read of a coiled spring that could be attached to the shaft that on being released would turn the engine over a dozen times or more. If any reader has any experience to offer, I will be glad to hear from him.—Hal A. Gilliam.

Several self-starters are on the market, few of which, however, have gained much popularity. The Winton company equips its six-cylinder cars regularly with a compressed air self-starter, having on the motor an air pump to maintain the necessary pressure within a storage tank on the chassis. Various types are built, one being the compressed air and another the magnetic. With all self-starters it is necessary to first have a charge in the cylinders, and a few devices include means for injecting from a special carbureter mixtures through small pipes to the cylinders.

POPE-HARTFORD COMPRESSION

Bardstown, Ky.—Editor Motor Age—Please tell me through the Readers' Clearing House the weight of the 1910 Pope-Hartford touring car. How many pounds compression has this car? What is the capital stock of the Packard Motor Car Co.? Has it ever declared any dividends?—Claude W. Wilson.

The 1910 Pope-Hartford weighs approximately 2,850 pounds and uses a cold compression of about 80 pounds. The capital stock of the Packard company and its dividend arrangement can be obtained direct from the company.

STATUS OF ROTARY VALVE

Kansas City, Mo.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following questions: 1. Has experiment taught that rotary valves for gasoline engines will stand the compression and explosion pressure enough to be practical. 2. Provided the necessary allowance for heat expansion was too great for sufficient pressure when cold, would not spring stops similar to compression rings be practical? 3. What makers are successfully using rotary valves?—P. D. Rouse.

Raymond, some 20 years ago, placed rotary valve engines on the market. Charles E. Duryea was a pioneer in this line of work, and there are others. In the meantime rotary valves have not found favor among builders of cars, and it is probably safe to say that no car, beyond the experimental stage, is to be had in America. On the other hand, now that Charles Y. Knight—of Silent Knight fame—has coaxed the British Daimler to adopt his sleeve type of valve motion, there is much activity in the direction of eliminating poppet valves, and some of the inventors are working on rotary propositions. It would be interesting to hear from Charles E. Duryea in relation to the troubles, if such there are, attending the use of rotary valves, involving the question of packing, heat changes and such other happenings as would seem to threaten the use of such valves.

BATTERY RAN DOWN

Osborne, Kas.—Editor Motor Age—My car is equipped with storage battery and dry cells. I recently had my storage battery recharged and when I put it back in the car I ran the ground wire from the negative of the dry cells to the positive of the storage. I then started on a 16-mile trip and the car ran fine. I noticed, however, that just before I arrived there that the engine missed a little. I remedied this by a slight adjustment of the coil. About 3 hours later when I was ready to return home it was impossible for me to get any buzz at the vibrators. I examined the battery and found that the box was hot and that my dry cells were melted, that is, the tops were melted and a number of the connections between the batteries were broken, caused by the cells rising up. I took out the dry cells, tested my storage and found that it was dead, or nearly so. I then found that my ground wire was broken off from its connection on the car. I put in new dry batteries, made my ground good and had no more trouble. What was the cause of the batteries acting that way? Is it good practice to ground one pole of the dry

cells and the other of the storage, using only one wire for a ground.—H. W. Nye.

The proper way to wire two sources of ignition with only one wire leading to the ground is to connect the ground wire to two like terminals. For instance, it would be all right to connect the two negative poles of the two sources of current to the ground wire and lead a wire from each of the positive terminals to their respective terminals on the switch; or you may connect the two positive poles to the ground wire and lead a wire from each of the negative poles to their respective terminals on the switch. Your error lay in connecting the ground wire to the positive pole of the storage battery and the negative pole of the dry cells, but this, however, was not the cause of the running down of the batteries. By connecting the batteries up as you did, you connected them up in series. This is impractical, because if the dry cells are weaker than the battery they will pull the voltage of the storage battery down to their level, and vice versa. It is believed that your dry cells were very much weaker than the battery, and while running these 16 miles the amount of current used for ignition was normal, but the drain caused by the dry cells was so great that as you neared the end of your journey the battery was so weak that an adjustment of the coils was necessary. The total running down of both batteries was undoubtedly caused by a direct short circuit between the wires which led to the switch.

SHOWING PAST AND PRESENT

Astoria, Ore.—Editor Motor Age—in the Readers' Clearing House of August 19, I noticed an illustration of a past and present style of transportation. I am sending herewith one that is one, and which I believe will antedate yours. Though it was posed for on the spur of the moment it is an actual fact and faithfully portrays a real condition which was true of actual conditions of 50 years ago. The bull team is on the only road that existed at that time, whereas the car is on the new road. Both in their day served the same route, that is, as a stage between two summer resorts on the north Pacific coast. This photograph, labeled "1849-1909," has reached wide popularity on the coast.—H. W. Cyrus.

AURORA-WEST BADEN ROUTE

Aurora, Ill.—Editor Motor Age—I intend taking a trip to West Baden and would Motor Age kindly advise best route and state kinds of roads to be encountered? Also state whether Indiana requires motorists from other states to procure number and license.—W. C. Langhorst, M. D.

Motor Age would suggest that your best route is from Aurora to Chicago, then to Indianapolis, by way of Hammond, Crown Point, Lowell, Shelby, Thayer, Rensselaer, Lafayette, Frankfort and Kirklin to Indianapolis. From Indianapolis the route to West Baden is through Edgewood, Southport, Greenwood, Whiteland, Franklin, Amity, Edinburg, Taylorsville, Columbus, East Columbus, Azalia, Reddington, Seymour, Brownstown, Vallonia, Plattsburg, Kossuth, Salem, Livonia, Millersburg, Paoli, Braxton Station and West Baden. The roads are good at the present time, a little sandy in places. An Illinois license will do; you do not need to get one for Indiana.

LEFT-HAND CONTROL

Washington, D. C.—Editor Motor Age—Will Motor Age give me the names and addresses of the manufacturers who make left-hand-drive cars, not runabouts, costing from $1,500 to $2,000?—A. H. Staples.

The Ford company has used left-hand control on its models for the past year, and for 1910 the Reo will utilize it. The Brush Runabout Co. also is an advocate of this system, while several years ago the Electric Vehicle Co. put out the Columbia model, using left-hand control. Nearly all electric cars are guided from that side also.

SIX-CYLINDER FUEL ECONOMY

Gambier, O.—Editor Motor Age—Relative to the recent discussion concerning the mileage obtained per gallon of gasoline in six-cylinder cars, the following statement may be of interest. The run was made with my Thomas 6-40, having in view no economy test, but under ordinary touring conditions on good country roads, August 30 and 31 of the present year. The tank, which has a capacity of 16 gallons and is 9 inches deep, was filled within about 1½ inches of the top when starting on the return trip west from Corry, Pa. A short detour was made at Erie, and after luncheon the car was driven to Cleveland, where the stop for the night was made. On resuming the journey in the morning the garage proposition of 20-cent gasoline was ignored when the tank showed a good supply, but at Ridgeville, 20 miles west of Cleveland, it was thought best to replenish the tank before starting on the trip toward the central part of the state. Much to my surprise, the tank overflowed at 9½ gallons. Taking into consideration the fact that the tank was not full at the start, this gives 8 gallons as a fair estimate of the quantity used. The trip mileage of the odometer registered 171.2 miles, the few extra miles being obtained at the stop in Erie and by missing the road east of Painesville. Consequently a conservative estimate gives 21.3 miles a gallon. The gasoline was the ordinary 15-cent variety, probably testing between 68 and 70. Six passengers were carried from Corry to Erie, by North East, and three passengers were carried from Erie throughout the remainder of the trip.

SIX-CYLINDER CRANKSHAFT

Hamler, O.—Editor Motor Age—Will Motor Age answer the following question through the Readers' Cleading House: Is it it possible to construct a six-cylinder gasoline motor with each crankset 60 degrees ahead of its previous one? Also, can such a motor be made self-governed by placing a governor on the carbureter throttle?—B. H. Stevenson.

It is quite possible to construct crankshafts for a six with the cranks disposed at 60-degree increments around the circle. The kinetic balance will not be so good as when the cranks are set in the usual way. The crankshaft will be far more difficult to construct, and it will be considerably reduced in strength; moreover, the amount of material required will be greater. Theoretically, is is possible to automatically control the speed, and in a measure the power of a motor, even a six, by placing a governor to actuate the air valve. Practically, no one ever has realized sufficiently good results to warrant continuing the practice. One of the difficulties lies in the lack of range of governors. Flyball or pendulum types of governors are only capable of sensitive performance at some one speed. Referring to air valves, attention is called to the difficulty of designing in such a way as to afford equal increments of opening for equal increments of angular travel of the lever motion, nor is it possible to make the friction or other retarding influences proportional to the volume of air.

PAST AND PRESENT AS ILLUSTRATED BY TRAVEL IN OREGON

SKIDDING PROPENSITIES OF MOTOR CARS

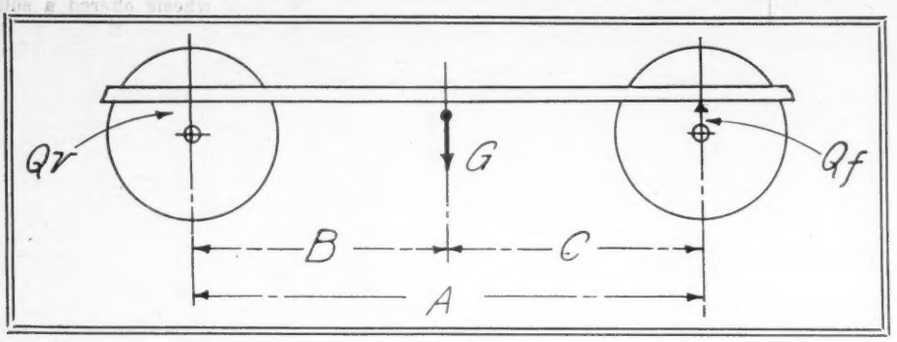


FIG. 1

A WEAK spot of the motor car is its behavior, when breaking, when rounding curves at unlevel condition of the ground's surface. Forces arise here which counteract the steering of the car so as to cause the driver to lose control of his machine and very often the car starts to skid. In spite of steerage the car runs directly against the very obstacle which the driver seeks to avoid, places itself crossways or comes to a stand in a position directly opposite to the original course.

It is a certain fault of the system and a large number of accidents are due to this certain unreliability, because at the skidding of the car the driver has lost the control over it. In the following investigation we shall see why a car begins to skid and what are the forces that act upon it and finally bring it to skid and force it from the wonted course. A car starts to skid when the forces which act upon it outside of the wheel plane are greater than the total pressure × coefficient of friction on the ground.

Lot Q = weight of the car.

u = coefficient of friction at the ground.

S = the resultant of all the forces acting upon the car, then

S must be = Q × u if the car shall submit to the steering gear; that is, if it shall not skid.

There evidently is no other cause for skidding than forces; we must, therefore, succeed in getting a clear view as to direction, amount and way of action of the same. To do this it is necessary to consider the main forces, which at a given moment may act upon the same. To these forces belong the initial forces of the motor, which acts at the circumference of the wheel; gravity in going down hill; acceleration of the masses if the clutch is out; the centrifugal force, when taking curves; the brake forces; the forces of gravity in going up hill; and the resistance caused by the coarse condition of the road's surface.

The car will skid if the sum of these forces is very large. Consequently it will appear when taking curves, when braking with a quick start, when the masses of the car are to be accelerated within a very short time, also when the friction at the ground is very small, as on a wet or slippery surface.

Position of Center of Gravity.

Before investigating the forces that act upon the car, it is necessary to understand that the position of the center of gravity in the vehicle will be of considerable importance, not only in regard to the absolute magnitude of the appearing forces but also especially in regard to the division of the same to the axles. From the position of the center of gravity it is also dependent upon the pressure on both axles, which determines upon a dry road surface the amount of the adhesion, Q × u; that is, the forces to which the taking up of the centrifugal forces must be left. At Fig. 1 can be seen how the pressure upon the front and rear axles increases or decreases with the change of the position of the center of gravity, according to the removal of the center of gravity nearer to the front, or rear axle. Accordingly, Fig. I, we get for the front axle:

$Qf \times A = G \times C$, and from this

$$Qf = \frac{G \times C}{A}$$

For the rear axle:

$Qv \times A = G \times C.$

$$Qr = \frac{G \times C}{A}$$

Thus we see that by shortening or prolonging of G or C the front wheel axle will be at one time more and the other time less charged.

But, since the centrifugal force goes also through the center of gravity it will, if resolved into its components when changing the position of the center of gravity towards front or rear, act at one time more skiddingly on the front axle, the other time more on the rear wheel axle. From Fig. 2 we get the following for the components of the centrifugal force, which acts as a skidding force upon the front wheel axle:

$$G = \frac{C \times \sin B}{\sin 180° - [(a - s) + B]}$$

The components for the rear wheel axle are:

$$Cv = \frac{Cx \times \sin (a - B)}{\sin 180° - [(a - B) + B]}$$

These equations give a clear view over the actions of the skidding forces upon both axles by moving the center of gravity. If a dry road the adhesion will be proportional to charge and we get if:

m = coefficient of the sliding friction

$$Qf = \frac{G \times C}{A} \times u \text{ for the front axle, and}$$

$$Qr = \frac{G \times C}{A} \times u \text{ for the rear axle.}$$

From the above it is apparent that the raising of the adhesion forces gives a means of challenging the damaging actions of the skidding forces.

Some kinds of motor cars require their weight to be kept as light as possible, that is, to make Q small. There is only one means for large adhesion forces, that is to get f the coefficient of friction, as large as possible.

Now the stresses upon front and rear axle Qf and Qv are composed of the specific plane pressure qx plane of friction p per cm².

It is thus generally that

Qf = qf × p for the front wheel.

Qr = qr × p for the rear wheel.

If, for instance, the rear wheel axle is loaded with 720 kg. each wheel will be loaded with 360 kg. and if at a round pneumatic tire the attached tire shoe is 120 cm², then the specific plane pressure

$$= qr = \frac{360}{120} = 3 \text{kg.}$$

This plane pressure is considered only by observation of the sliding. The greater this pressure the more it will press aside the soil on the road's surface and the ad-

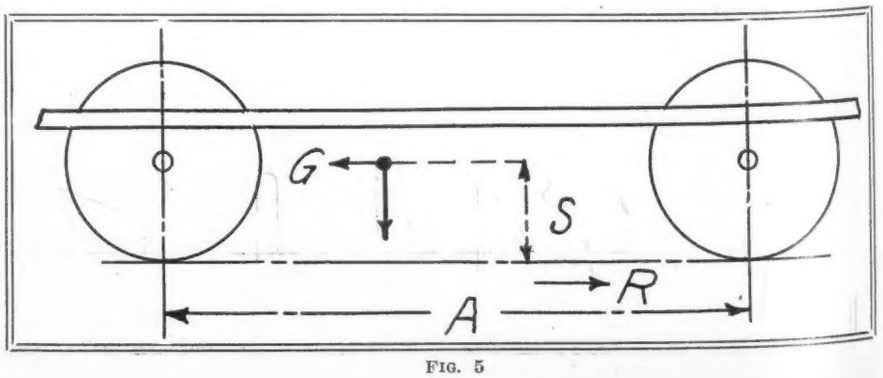


FIG. 5

hesion of the wheel will be increased. The smaller the pressure the easier will be the sliding and the less is the resistance of adhesion on the ground. This plane pressure may be increased in various ways, as by decreasing the area of the rubber, which comes in contact with the ground, which is done to a small degree by pumping up the tires hard. Further by a special profiling of the tire shoe as may be found on the, so-called, anti-skidding devices. On these the wide round tire shoe is always replaced by a new plane, which often also contains separate attached ribs or plug insertions. But the plane pressure of the car must be of a certain magnitude to avoid skidding.

Under all circumstances the formerly quoted statement remains, namely, that Q×u must appear as the component S in order to still avoid skidding. But since u acts differently according to the more or less slippery conditions of the ground the component S is also subjected to the change, q×p, must thus have a different result. The component S is also subjected to the slope of the streets to both sides and other naturally uneven conditions of the ground.

The distance of the center of gravity from the surface need also not be considered, since the centrifugal force forms a moment of tilting with the adhesion force and thereby charges one wheel and discharges the other. Fig. 3 represents the vertical section of the rear axle of the car. If the center of gravity of a car lies very high the side force S, which introduces the skidding forms, since S is the resultant of the centrifugal pressure Gr a moment of tilting, which discharges the right rear axle and charges the left one

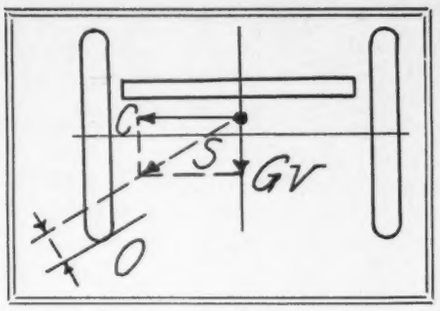


FIG. 3

and with the lever arm S tries to overthrow the car over the point of contact O.

The specious forces and especially those at the motor, or the live forces, and the forces driving the rear wheel to the front are not considered here in order to get as simple a view as possible. If these forces were considered also they would form a resultant, which is not in the drawn vertical section, but which would lie in a plane oblique to the direction of the course of driving. But even in this case a corresponding moment of tilting would arise about the point of contact O. The side force S is also dependent upon the side slope and other natural conditions of the street.

Herein is found the verification of the practical experience that a car skids the less—the more—the front or rear axle respectively is loaded and the lower the center of gravity is situated. As regards the position of center of gravity it must be considered that if the front axle is unloaded too much the reacting resistance becomes too small, so that if skidding appears the wheels cease to form a turning point, but are simply shoved aside, because of insufficient adhesion. The effect of this is that the entire car following its rear part is shoved sideways of the street, while if the front wheels offered a sufficient resistance of adhesion, the car would turn around the front wheels and would describe a circle with a point under the front axle as a center.

The above shows that at a given wheelbase and at a weight there is a position of the center of gravity in the car at which the skidding forces become a minimum. Now it is important, when constructing a motor car, there are 1,000 and more reasons against the fulfilment of this requirement and that important factors arise to which the position of the center of gravity must be subjected. The Brazier racing car shows that in designing it the position of the center of gravity had been considered to the greatest extent.

Rounding of Curves

At the beginning of the curve the centrifugal force is at the moment of the start equal to zero, and hence does not add to the skidding forces. The formerly mentioned forces are in proportion to the great centrifugal force, brake force and initial force so infinitely small that they may well be omitted without making an error of any value. If the car tends to sliding at the start it is doubtless the slippery surface and the side slope of the street, which may cause skidding, but the car does not follow any law; it simply aims to slide to the place which offers the least resistance, in a case like that of the street. What interests us mostly is the force which, when curving, may cause skidding.

Braking Efficiently Done

The wheels will slide when braking, because the braking force at the circumfer-

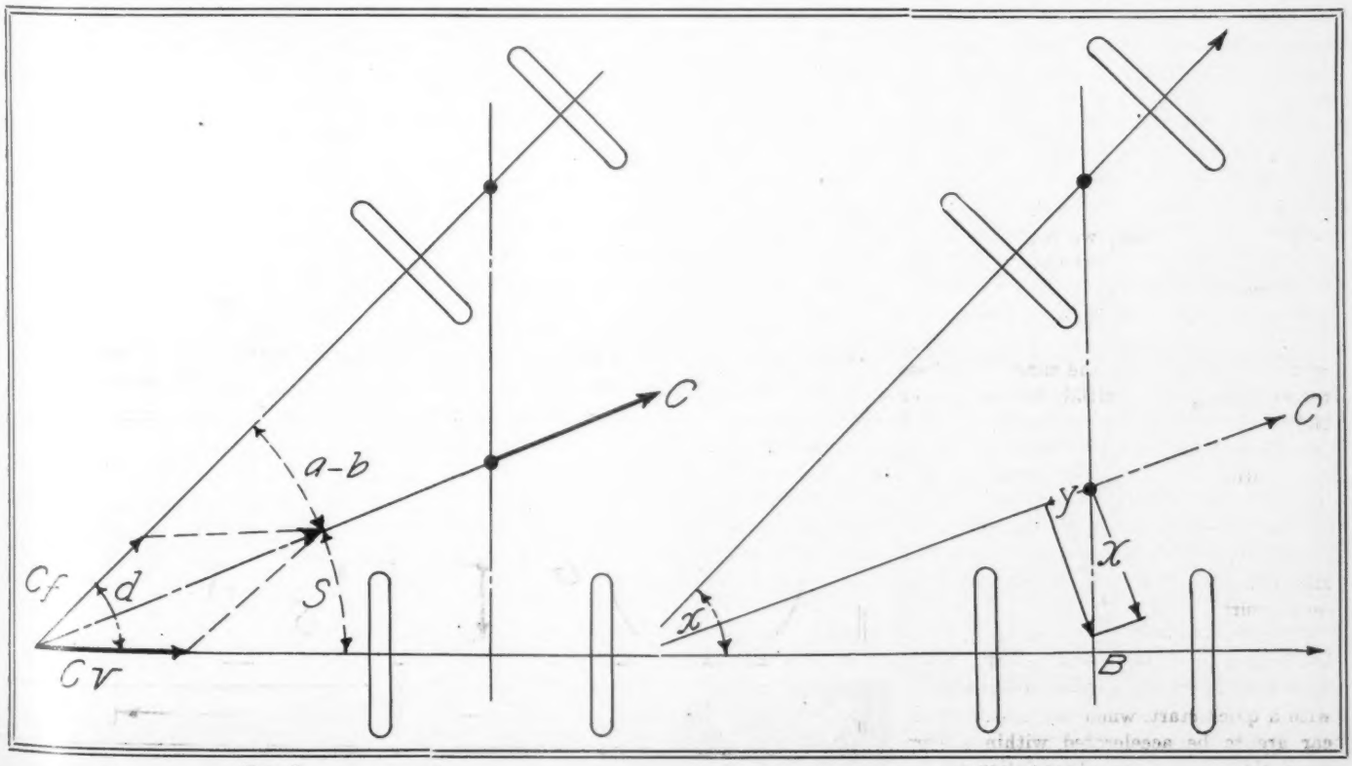


FIG. 2

FIG. 4

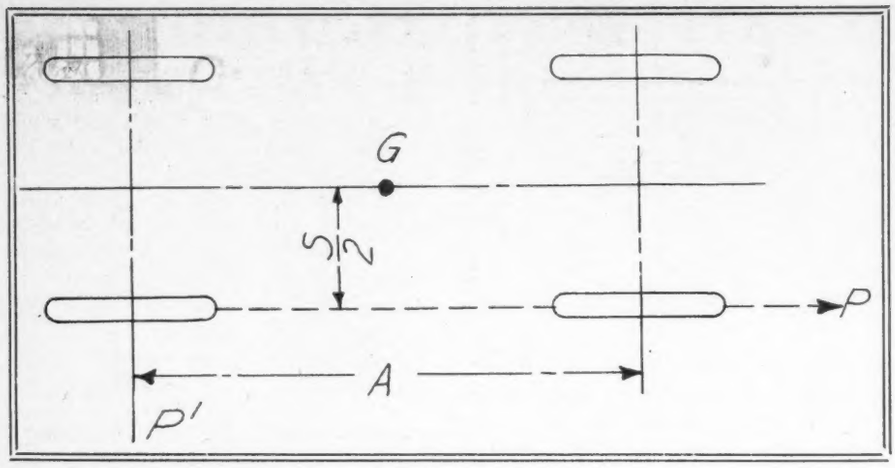


FIG. 6

ence of the wheel is greater than the coefficient of friction and wheel pressure. By Fig. 4 there is, when braking, the brake force B and the centrifugal force C, and the miner forces, as driving, resistance and delay, may be omitted. When resolving the braking force in turning point of the car into components normal to the line of action of the centrifugal force C, come a component x and a component y. The component y acts against the centrifugal force C. Then there is the skidding force $K_1 = C - y$. Otherwise it is to be considered that at rear wheel braking the rear wheel axle is discharged, while the front wheel axle becomes more charged.

Hence, if a car while in full speed is broken by the force B the weight G that is combined in the center of gravity will, because of its inertia, move itself forward with that same force. This gives, in accordance with Fig. 5, a movement $W \times S$, which tries to lift the car in the rear, whereby the front axle becomes more charged. If A is the wheelbase, then the force which discharges the car in the rear is $W \times S$, where S represents the distance of the center of gravity from the ground. The wheel pressure of the rear axle then becomes $Q'r = Qv - \frac{W \times S}{A}$ and for the front axle $Q'f = Qf + \frac{W \times S}{A}$.

Thus an increase of the braking force will cause a decrease of the wheel pressure upon the ground. From the foregoing the conclusion is reached that a prolonging of the wheelbase, the skidding moment increases owing to the longer radius of oscillation about which the rear axle swings.

Deductions Are Made

From the above it follows: First, that the skidding of a car when rounding a curve without brakage decreases, with a shortening of the wheelbase; second, that the skidding of the car, when rounding a curve with brakage decreases, with a prolonging of the wheelbase.

On a straight course the causes of skiding are either uneven brake forces, or if one driving wheel revolves faster than the other; hence in the differential the latter appears always at a coarse road, when one wheel, for instance, runs over a dry part of the road, while the other runs over a wet or slippery part. Since friction is much less on slippery ground, the wheel on the dry part requires a greater initial force. The car is thus driven on one side. This angular appearing force if transposed to the center of gravity, the car gives a turn moment $M = P \times \frac{S}{2}$, where S represents the wheel distance. The skiddingly acting force thus becomes $P' \times a = P \times \frac{S}{2}$, and from this $P' = \frac{P \times S}{2a}$

This force decreases with the increase of the wheelbase, and from this it follows that at a greater wheelbase the skidding of the car decreases if the initial forces in the differential are the causes of the skidding.

The above thus explains that the forces which cause the skidding of a car may to some degree be decreased, but that the skidding can never be entirely avoided. A good means we have in a good Antiderupent. And the base of all is evidently to drive slowly and carefully at such places which make skidding possible.

To sum up then, as stated in the Automotor Journal, this curious and frequently dangerous occurrence is produced by several different causes, acting separately or in groupes, according to the existing circumstances. These may be roughly divided into two groups: Those due to road conditions, and those due to car conditions.

When the brakes are suddenly applied the grip of the back wheels upon the road surface is very greatly reduced. If this occurs upon a heavily cambered roadway the natural tendency due to gravity is for the skidding wheels to slide down the slope sideways. And since the front wheels remain almost stationary the car turns about a point near the front.

If this cessation of grip of the braked wheels occurs when the car is traveling round a curve or behind another vehicle also stopping, or, in fact, on any occasion when the front wheels have been turned slightly, the same turning tendency will be met with for the following reason. When the car is traveling straight the tractive force or the momentum of the car when the tractive force has been removed acts along a line passing through the center mass of the car. Let us suppose that we know the position of the center mass of the car. If thec ar has been traveling along a straight course and is suddenly diverted to the right or left a considerable force must come into play to bring about the change. This force is supplied through the friction between the tires and the road surface. Teh front wheels, by virtue of their free rotation receive their share of the diverting force and, in consequence, the front of the car at once assumes the direction in which the car was turned. But the back wheels, having lost their grip, are made to slide transversely over the road by the turning movement produced by the momentum and the distance from the center of mass to its line of action.

It is evident that the distribution of load in the car would affect this turning movement—by altering the position of the center of mass. Another cause may be attributed to the action of the differential gear. When a foot brake is applied to a dru mon the propellor-shaft, its effect is to hold the bevel-jinions of the differential in a fixed position, thus causing any rotation of one road-wheel to be transmitted reversed to the other. This would, of course, produce a turning effort which, though perhaps very slight, would be quite sufficient to start the motion—whereupon the other causes would come into play.

Probably the best remedy for this evil is to have all four wheel mounted upon stub axles, the drive being through universal joints, and a system of links introduced by means of which the two pairs of wheels can be turned at will, either in the same direction or in opposite directions. When they are turned in the same direction some allowance must be made for the non-parallelism of Ackermann's system. By this means the lien of action of the momentum is kept passing through the center of mass until the brakes have been released and side slipping avoided.

The Motor Car Repair Shop

WIRING AND TIMING MAGNETO

THE only wiring necessary for a true high-tension magneto, that is a magneto in which the current is both generated and induced, is shown in Fig. 1, and consists of:—heavily insulated secondary wires S which lead from the terminals on top of the magneto distributer to the spark plugs on the respective cylinders, one primary wire P leading from the terminal post D on the front plate of the distributer to the switch on the dash, and the other switch wire, which is connected to any point on the frame of the car having good metallic contact with the motor, and which is for grounding and stopping the ignition. To time the magneto with the engine, after lining up of the magneto has been completed, have the spark lever fully retarded. The spark is advanced by moving the lever L on the magneto in the opposite direction to that in which the armature turns, and is retarded in the same direction that the armature turns. Bring the piston of No. 1 cylinder to its firing center, that is, to the beginning of its firing stroke. Turn the armature from the driving end at the coupling to get the revolving carbon-brush or brass-segment which forms the contact in the distributer, in the center of the stationary segment whose wire leads to No. 1 cylinder; then tighten the coupling. Be sure that the other wires from the distributer lead to the proper cylinders. In case the engine needs more retarding or advancing of speed, loosen the coupling on the driving end of the armature, and turn the armature slightly backward or forward as the case may be and retighten the coupling. Where no adjustable coupling is used it will be necessary to move the driving gear backward or forward one or two teeth.

A NON-ADJUSTABLE SPRING

Errors in the assembly of the component parts of motor-car mechanisms are quite

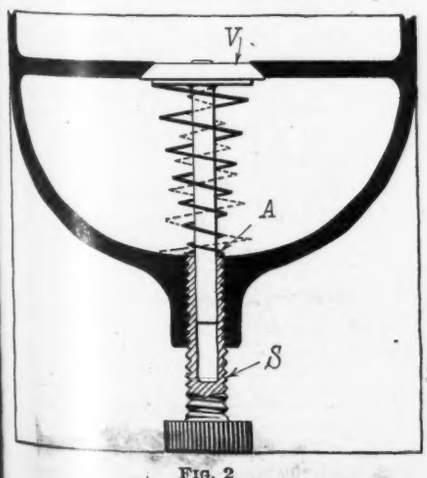


FIG. 2

Hints For the Amateur

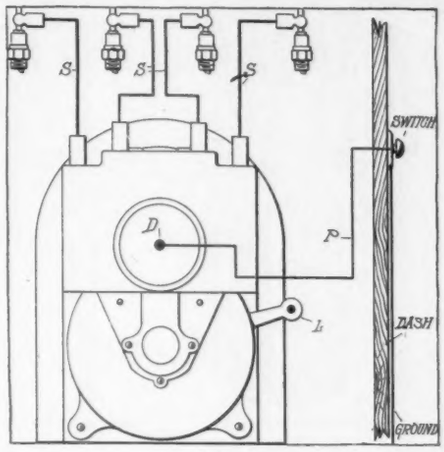


FIG. 1

common, and do much to educate the novice and stimulate the repair business. A ludicrous error which was the cause of much trouble and some obscene language, is shown in Fig. 2, which represents the air-valve of a carbureter. The valve is held on its seat by a spiral spring which allows the valve to open automatically as the suction overcomes the tension of the spring. In order that the tension of the spring may be adjusted, its apex A is designed to rest on the adjusting screw S. For some obvious reason, this valve mechanism was removed by an amateur, and in replacing same the spring was turned around as indicated by the dotted line. This rendered the valve non-adjustable and caused much trouble and loss of time before it was discovered.

CARBURETER FLOAT TROUBLE

In Fig. 3 is shown what happened to a perfectly innocent carbureter, whose owner having graduated at an early age from a college of mechanical engineering, and although not working at his profession, was disposed to make his own minor repairs. This carbureter had for many months given good service, but suddenly there developed a tendency on its part to flood when the car was standing idle. After pondering over the various theories as to why a carbureter should flood, the owner came to the conclusion that there was an accumulation of dirt around the needle valve in the float chamber. Removing the carbureter from the motor and quickly dissembling the same, the cause of the trouble was exposed; there was an accumulation of dirt around the needle valve. Needless to say, the owner was satisfied with his power of diagnosis, so the carbureter was thoroughly cleaned up, assembled, and replaced on the motor with the float in the reverse position as designated by the dotted lines in the above mentioned illustration. Having properly made all connections, turned on the gasoline, and allowed the float-chamber to fill up, the part of the needle-valve which protruded through the top of the float-chamber remained motionless, and the tendency to flood was even more marked than before. It was plain that the float was not working, so turning off the gasoline and again removing the cover of the float-chamber, the float was carefully examined and replaced in the same way, the valve and its mechanism was also closely scrutinized and tested, the parts were again assembled, and still—it flooded. Having devoted a reasonable amount of his valuable time to this phenomena, the owner took the car to the local repairman, who, after a few questions and a casual examination, removed the cover of the float-chamber, turned the float over, replaced the cover of the chamber, turned on the gasoline—and there was no more flooding. "Have a cigar," said the owner.

REPLACING DRY CELLS

In putting new cells in your motor car, never place in any more cells in series than originally came with the machine. With a good coil four to six cells in series will give satisfactory service on almost all cars, and if four cells gives satisfactory service, then a greater number connected in series will last a shorter length of time, to say nothing of the excessive burning and pitting of the platinum points of the coil. To anyone not versed in electrical matters this statement seems strange, but it is easily understood if you consider that when you add more cells the voltage of the battery is raised. Consequently a greater amount of current would flow through the coil, and the more current that flows, of course, the shorter will be the life of the battery. When adding fresh cells to a battery test all cells and remove those which are almost run down.

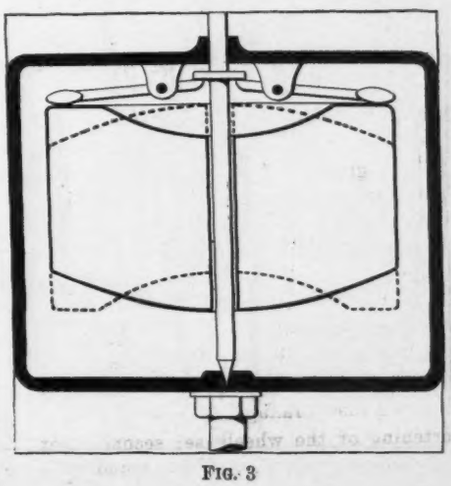


FIG. 3

CRANKSHAFT CONSTRUCTION AND DESIGN

By Thomas J. Fay
(Continued from Last Week)

THEORETICALLY, it should be possible to so design crankshafts so that they would last for a predetermined number of revolutions if the conditions are also well defined. That the conditions can be definitely fixed beforehand is only approximately true, and it therefore follows that the theoretical design will fall short of finality by the difference between fixed and approximate conditions. That precedent is the main guide in actual practice is a moral certainty, and just so long as the working conditions rest under a cloud, safety lies in accepting precedent.

That any crankshaft should be so designed that it never would fail, no matter how long and continuous the motor might be run, cannot be accepted as true on the count that the rest of the motor and the car in which it is placed to furnish power will not last for more than a certain length of time. But there is no danger of being able to so design a crankshaft that it never will give out since the kinetic life of steel is definitely limited, and that a crankshaft has to perform under kinetic conditions is too true to be disputed.

Since there is much uncertainty involved in determining not only the kinetic life of the steel available for use in this class of work, but the kinetic work imposed as well, it becomes necessary to exert every ounce of skill that can be mustered in, and draw on the best available stock of material for the purpose. With the requisite skill, unexceptionable grades of steel and modes of manufacture such as will accentuate the properties of the steel in the direction of kinetic responsibility, the chances are that the product when finished will last quite as long as the less imposed upon parts of the motor and the car as a whole.

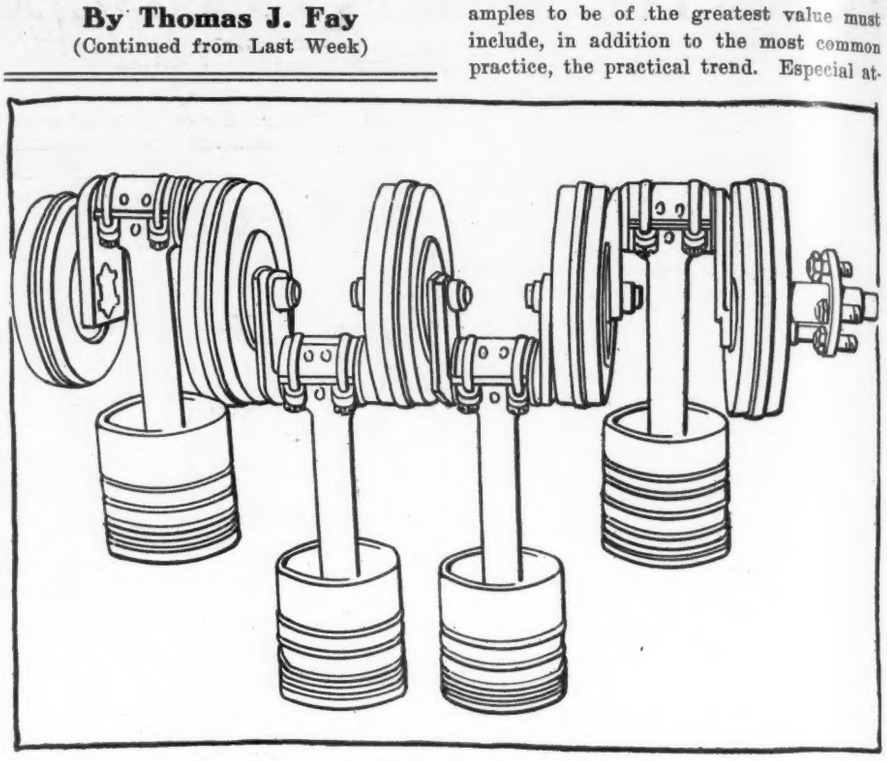


FIG. 18—BUILT-UP CRANKSHAFT SHOWING CENTRAL HOLDING BOLT

Success Takes Precedence

If it is not safe to depend upon theoretical calculations for proportions of crankshafts, then the best treatise on this phase of the motor car will be the one which will adequately depict the greatest number of examples of actual crankshafts taken from successful practice. The examples to be of the greatest value must include, in addition to the most common practice, the practical trend. Especial attention should be given to the class of work which represents the most rare and most likely future practice. True, this savors of predicting, but it should not be out of place to depict the trend, which in all truth does not constitute prediction as it should be understood.

It will not be proper to avoid theoretical work merely because enough practical examples are at hand to enable designers to build motors without having to risk gross error, but theoretical deductions will be more easy to master after the examples are shown and discussed. Under the circumstances then, since recourse may be had to a variety of examples of crankshafts, it will be the plan here to show

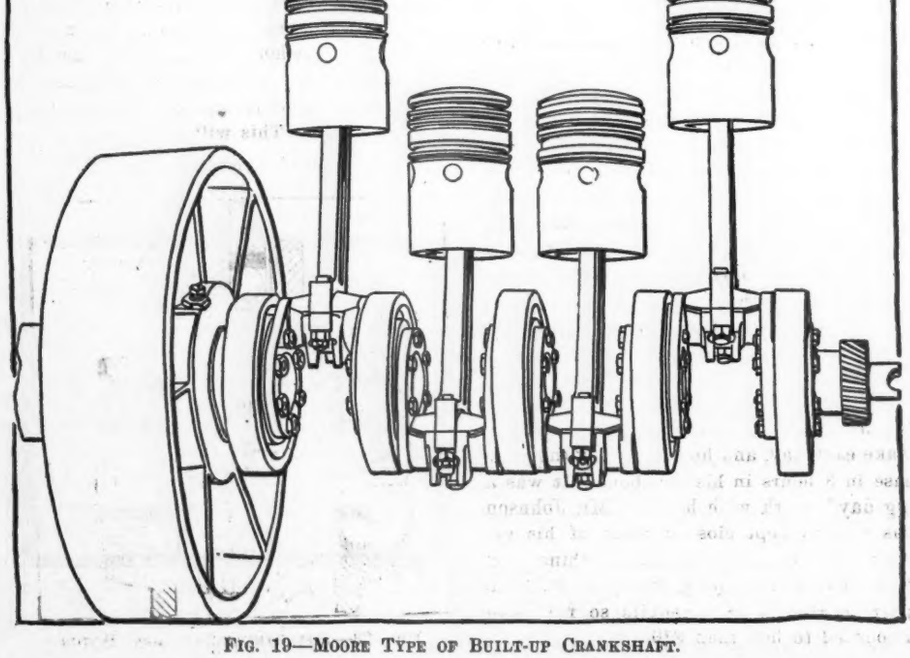


FIG. 19—MOORE TYPE OF BUILT-UP CRANKSHAFT.

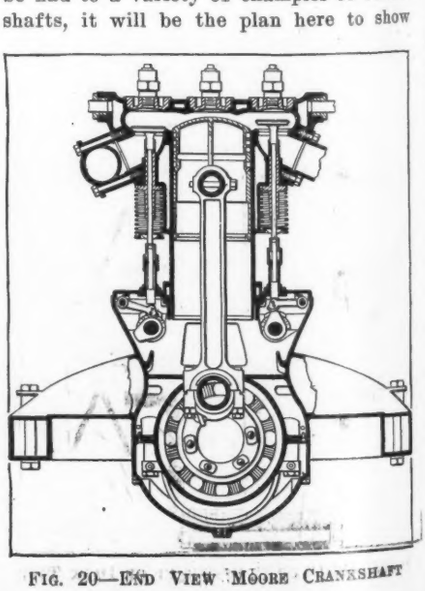


FIG. 20—END VIEW MOORE CRANKSHAFT

how results are attained; discuss their phases, and follow up the work by exposing as much of the underlying theory as the situation would seem to warrant.

Trend in Ball-Bearing Crankshafts

This class of crankshafts is divided into two classes—built-up types, as illustrated in Figs. 18, 19, 20, 21, 22 and 23, and all other types. In discussing the built-up types of crankshafts it may be well to say they lend substance to two-cycle efforts, for as Fig. 7 indicates the crankcase, space may be quite completely taken up in the process, which is one of the prime requirements in two-cycle work if crankcase compression is used. Figs. 21, 22 and 23 also show how the crankcase space may be taken up when built-up crankshafts are used, and as to the expediency of adapting built-up crankshafts it is enough to say there are advantages as well as disadvantages, so that it is largely a matter of skill, coupled with adequate facilities. Certainly the example as shown in Fig. 19, an end view of which is given in Fig. 20, represents success from the point of view of utility. This crankshaft as a type was brought out in the Moore car, and of the number of machines built all performed up to a high standard, and the crankshaft detail was an entire success. The system of building up consisted in fashioning the crankpins with flanges, and besides providing centering offsets, the flanges in juxtoposition were bolted together by means of six alloy steel bolts through six reamed holes. It may be that this plan requires a degree of accuracy, and it may also be suspected that some of the bolts will have to do more work than others, but this detail is adequately cared for since any one of the bolts is capable of doing all of the work without shearing off. The advantage of being able to remove and replace a ball bearing at will is something to take into account, which advantage was penalized in this case since the ball bearings used were of the annular type and large for the duty imposed. In other words, every care was exercised to select capable bearings so that the advantage of being able to make a quick repair was not of such great importance as would follow the use of smaller bearings of a less stable make.

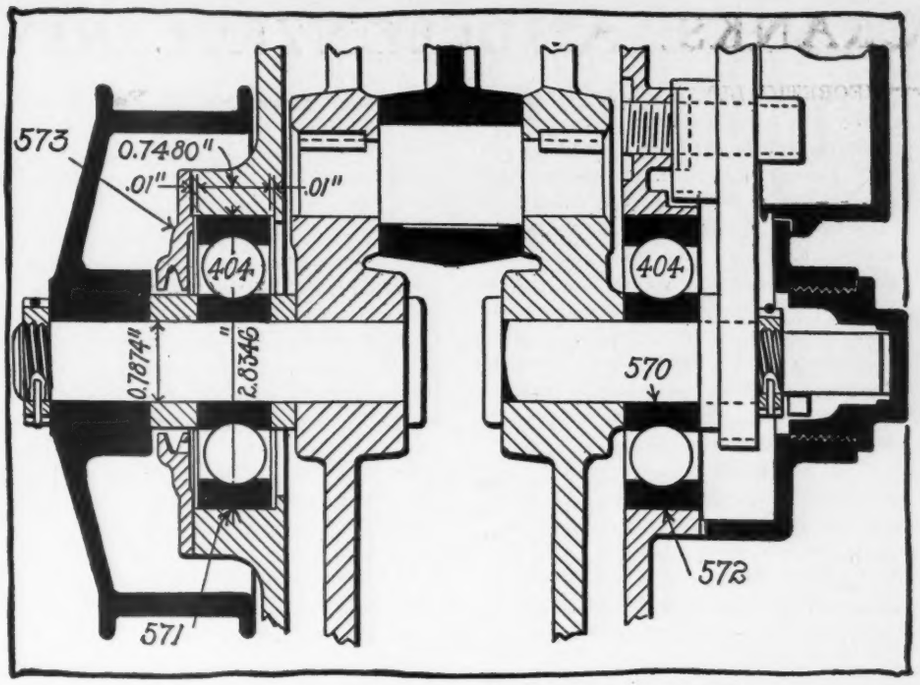


FIG. 21—BUILT-UP CRANKSHAFT FOR SINGLE-CYLINDER MOTOR

Fig. 18 differs quite a little from the Moore type of crankshaft since the flange bolting is eliminated, brought about by splitting the flange on the center line of the ball bearings, and by means of a security bolt at the axis of the flanging, the halves are pulled together after the ball bearings are put into place, and the driving is done through six tapered buttons of alloy steel, disposed around the central holding bolt. The tapered buttons do not bottom, so that it is not necessary to machine them to absolute accuracy, and since the central pull bolt is provided with a head in the mid position, it may be used in disassembling the shaft as well as in assembling it. But one of these shafts was built, in so far as the author is aware, but it worked very well, and as to the cost, it was quite as low as competition would seem to demand, especially when the crankshafts are made of alloy steel.

Fig. 22 represents a case in which the connecting rod bearing is provided with a ball bearing of the Hess-Bright type, and although the bore of the cylinder in this case is quite limited, thus assuring that the ball bearing will easily do the work, the fact remains that ball-bearing connecting rods offer a certain attraction, and it never has been shown that they will fall short of the best requirement. This particular example also shows the disks large enough to afford a requisite increment of flywheel effect, such as would lend advantage to single-cylinder work. Certainly large overhung flywheels impose considerable work on a single outboard bearing, and when the flywheel can be eliminated by substituting crankshaft disks this class of trouble will not have to be coped with. This will help some.

(To be continued.)

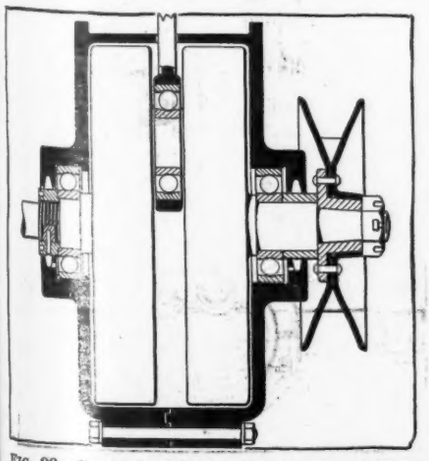


FIG. 22—BUILT-UP CRANKSHAFT OF DISK TYPE

DISCOVERS MOTOR ECONOMY

W. A. Johnson, a rural free delivery carrier in Ottawa, Kan., decided after careful investigation that a small motor car would answer his purpose better than his three horses and wagon. As a result, he purchased a Brush runabout complete at a total outlay of only a little more than he had invested in horses and equipment. The route Mr. Johnson covers is 25 miles long and is through the hilly country west of Ottawa. Not only are the roads rough, but the hills are real hills. On the route Mr. Johnson has eighty-four mail boxes to make each day, and he covers this run with ease in 3 hours in his runabout. It was a big day's work with horses. Mr. Johnson has always kept close account of his expense for maintaining his machine and finds that it is costing him just $61.80 a year to run it. His repairs so far have amounted to less than $10.

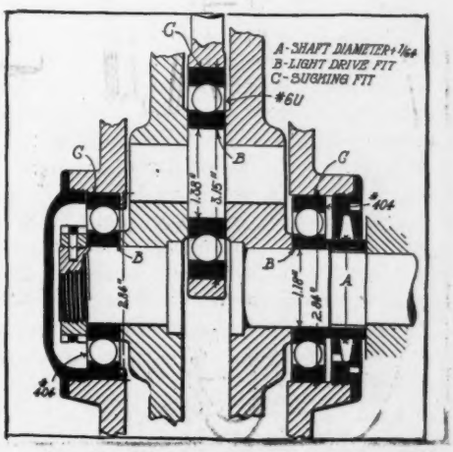


FIG. 23—FOR SINGLE-CYLINDER MOTOR

BENZOL AND BENZINE AS MOTOR FUELS

SOME time ago, says Dr. Fritz Schmidt, he was asked by an owner of an explosion motor, who had for a long time used benzol instead of benzine, how the fact could be explained that the motor cylinder after many years of use of benzine remained in excellent condition, whereas when he used benzol they were much corroded. In the explosion chamber of the motor cylinder one could see a number of pits, in which places the cylinder thickness was so much reduced that it could no longer be regarded as safe to use. The chemist in question had been many years engaged in the distillation of tar, and therefore knew the nature of the lighter tar oils; and he remembered an analogous case noted by himself and others, where the still coils were corroded by benzol, sometimes to the thickness of paper. This corrosion of the pipes, as well as of the interior of the retorts, made it necessary to replace them every 2½ to 3 years. There seemed to be a belief that the corrosion was due to the ammonia and the so-called nitrates in the first stage of distillation of the benzol. But 90 per cent benzol, which is used as motor fuel, and which is refined by means of sulphuric acid and soda lye, and fractionally distilled, contains no more ammonia. Further, iron is not so corroded by chemically pure benzol. It follows that the pitting of the cylinder was due to impurities in the benzol, of such sort that they could not be removed on a commercial basis in the manufacture of the 90 per cent liquid.

Among such impurities are the thiophenes, which contain sulphur, and the carbon sulphides, to both of which manganese is very sensitive. In one specimen of 90 per cent benzol which was tested, and which was used for motor cars, thiophene was found. The amount of this substance was only about .4 per cent, but this quantity was sufficient in the end to corrode the steel cylinders, which contain a high percentage of manganese; so that they had to be replaced after 1 to 2 years' use. Manganese is very readily attacked by the sulphurous products of decomposition, and manganese sulphide is formed thereby, which would account for the damage to the motor cylinders. Therefore where benzol is used for motor drive, care should be taken that it is chemically pure. But the chemical purification of benzol from thiophene is attended with great expense, so that there is no probability of finding in the market for motoring purposes a benzol which is free from this substance. But benzine is free from such impurities, therefore damage to the motor cylinders by its use for power purposes is not to be feared.

Although for this reason the use of benzol for motors is not to be recommended, the relative advantages of benzol and benzine were further weighed against one another and benzolkoller showed not to be so advantageous as claimed therefore. According to Dr. Schmidt, no one who has gone into the question thoroughly has been able to show any advantages of benzol over benzine for motor purposes—and especially for motor cars—except the lower first cost.

That attempts have been made in this direction is natural; but when subjected to the proper tests the results are not evident. In such matters the first question should be: To what use is the material to be put? Only then comes the question of cost; for saving in expense by the use of an unsuitable material is not to be advocated. The losses by the use of improper material can more than balance the apparent cheapness in first cost. This seems to be particularly the case in the attempt to substitute benzol for benzine as motor car fuel. As with the use of benzol, it is necessary, after every long trip, to give the cylinders a thorough cleaning; this alone, despite the lower price, should make the motor car owner pause before adopting it. Experts state that benzol can be used only where the vaporization is effected by surface evaporation. It is also recognized that this method of vaporization is not suitable for motor cars, and it has long ago been given up by many builders. In its place there is used the atomizer system, which can be used only with very volatile liquids. As, however, benzol is not very volatile, it may be seen that for this reason alone it is not to be recommended for motor car use. The increasing use of the atomizer principle for vaporization leaves benzol out of the question for this purpose.

When it is stated that 1 liter of benzol makes 5 cubic meters of gas, while the same quantity of benzine produces only 2½, and further that 1 cubic meter of air will take up only 250 grams of benzol and preferably only 160 to 200, the economy of benzol is supposed to be proved. As a matter of fact, however, this shows only that benzine is twice as readily put into the form of vapor as benzol, in which form only it is explosive. Benzol, of which seventy-eight parts by weight contain seventy-two of carbon and only six of hydrogen, while of benzine (C_6H_{14}) eighty-six parts contain seventy-two of carbon and fourteen of hydrogen—requires for evaporation a higher temperature, or requires more time, than benzine which contains more hydrogen; and it produces no more gas than the latter. Outside of the question that the benzine, by reason of its greater proportion of hydrogen, is decomposed at a lower temperature, and that its products of decomposition are more readily ignitable than those of benzol, and produce by their combustion or explosion a higher temperature, there can be no question—in view of the equal quantities of carbon in the two substances—of a greater production of gas on the part of the benzol. On the contrary, the net efficiency of benzine is some higher than that of benzol. On the other hand, the atomizing of the benzine is so easy to regulate that only so much may be sprayed in as is necessary; for which reason the benzine can be entirely utilized and transformed into work, without any loss, which is not the case with benzol. Therefore the greater production of gas, weight for weight, of benzol over benzine, is not proved; for when we consider the absorptive power of the air for benzine as compared with that for benzol, the former has the advantage. If further there be considered the amount of oxygen—or of air, that contains 20 per cent of this element—which is necessary for the perfect combustion of a molecule of each of the two elements in the materials in question, benzol being C_6H_6—78 and benzine C_6H_{14}—86, we have the following results:

For benzol C_6H_6 the six atoms of carbon require for combustion into carbonic acid gas CO_2	12 of oxygen
The six atoms of hydrogen require for combustion into water H_2O	3 of oxygen
Total	15 of oxygen
For benzine (C_6H_{14}) six atoms of carbon require for combustion into carbonic acid gas CO_2	12 of oxygen
Fourteen atoms of hydrogen require for combustion into water H_2O	7 of oxygen
Total	19 of oxygen

This shows that for the perfect combustion of the benzol only fifteen parts of oxygen are necessary, while benzine requires for the same quantity nineteen—that is, that in making gas to drive the piston the proportion of benzine and air is more favorable than that of benzol and air. Hand in hand with this is the fact that the hard coal tar oils, by reason of their comparatively low percentage of hydrogen, are not so suited for the production of vapor or gas for motors, while the distillates of petroleum and soft coal are admirably suited therefor.

It is said that benzol burns almost without odor, because it is a simple substance; whereas, benzine, being a mixture of several hydrocarbons, does not. The first statement is not true. It is a fact, further, that even pure benzol, which costs about twice as much to produce as benzine, cannot be burned without odor,—outside of the question that with the rapid gasification in a motor car this would in any case be impossible.

The cheap and chemically impure benzol which is used for this purpose never could be burned without odor; there are too many impurities therein. The products of gasification of the very sulphurous impurities in this material are even poisonous;

whereas the products of combustion of benzine, while not exactly pleasant, are at least harmless. It is therefore to be feared that from the hygienic point of view the general employment of benzol in city streets would give rise to interference on the part of the municipal authorities.

It is in the interest of the general extension of the use of motor cars to be hoped that the already very exacting laws limiting the employment of the self-propelled vehicles should not be rendered more severe:—a step to which an increase in the impurity of the air would surely lead. That this would be unavoidable in cities like Berlin will be seen at once from the fact that several manufacturers of motors have already stopped their experiments with benzol, because it made their workmen ill. The same experience has been made in the manufacture of the benzol itself, where many cases of poisoning by breathing its vapors have been noted.

The result of the many expert tests go to show that motorists should be against the use of any but absolutely chemically pure benzol; just as manufacturers of benzol should be warned not to base their hopes too firmly on the universal adoption of this material for motor cars.

ENERGY COMSUMPTION OF BUSINESS VEHICLE

EDITOR'S NOTE—The following paper on "Energy Consumption of the Commercial Vehicle" was read by Alex. Churchward at the summer convention of the Society of Automobile Engineers, held at Chicago August 5, 6 and 7.

WHEN studying the performance of the motor vehicle, one of the most important items is the energy required per ton-mile. We can rely upon the engine to give a certain horsepower output at a predetermined speed. Therefore, knowing the maximum horsepower output of the engine, we can readily determine what service the vehicle is capable of performing.

The horsepower required by a vehicle, however, is influenced by a number of factors, the principal ones being:

Tires—Ordinarily the standard vehicles are equipped with either pneumatic or solid tires, pneumatic on the lighter vehicles, such as runabouts, coupes and broughams. Solid tires on some runabouts and cabs, and nearly always on commercial vehicles. The tractive effort of pneumatic tires on hard level asphalt varies from 15 pounds per ton for special tires designed for electric runabouts up to 35 pounds per ton for the standard type used on gasoline touring cars. The tractive effort of pneumatic tires is also greatly affected by the air pressure, increasing rapidly as the air pressure is reduced. The tractive effort of solid tires on hard level asphalt varies from 18 pounds to 26 pounds per ton, depending upon: The diameter of driving wheels; revolutions per minute; load in pounds, per square inch or pounds per inch width; composition of the compound used; method of attaching tire to wheel rim.

Controlling Apparatus—The efficiency depends a great deal upon the type of drive used, such for instance as: The sliding gear with direct drive on the high through a bevel on live rear axle; sliding gear with direct drive on high through countershaft and chains to dead rear axle; sliding gear, not direct on high, and through countershaft and chains to dead rear axle; planetary with direct on high by means of bevel or chain to live rear axle; planetary to countershaft through chains to dead rear axle; friction gear to live rear axle through bevel or chains; friction gear to dead rear axle through chains; worm drive direct on high to live rear axle. Some form of independent clutch being used on the first, second, third and eighth.

Transmission Losses — These include gearing or chain losses, and all bearing losses throughout the vehicle. Most vehicles today are built with anti-friction bearings throughout. Ball bearings always should be used in the countershafts; ball or roller bearings in the wheels. Personally, I prefer ball bearings throughout, and my experience has shown that ball bearings in the wheels are perfectly reliable when properly selected and correctly installed. From countershaft to wheels the roller chain has proven itself satisfactory, but care must be taken in the selection of the make of chain, also the right pitch and number of teeth in the sprockets.

Alignment of Axles and Driving Mechanism—Unless the alignment is perfect under all conditions of maximum stress, the energy consumption will be high. An axle sprung beyond the elastic limit by overloading may increase the energy consumption 10 per cent to 15 per cent. A vehicle that coasts freely may require too much power when the driving stresses are applied. Therefore, all parts must be in perfect alignment under all conditions to be met with in service.

Correct Gear Ratio—Unless the gear ratio is correct for the average service the vehicle is called on to perform, the motor will either run at too high an average speed or the change gears will have to be used very frequently, which will tend to increase the maintenance of the vehicle when placed in the hands of a careless driver.

Wheel Diameter—Small wheels will increase the energy consumption materially on the average roadbed, because the smaller the wheel diameter the greater the vehicle vibration when going over an obstacle of given height.

Springs—The springs of a vehicle must be correctly proportioned and of suitable material; otherwise there will be considerable movement of the vehicle body when going over uneven roads; this, of course, means energy consumed which cannot be restored.

Road Resistance—The tractive effort of a vehicle will vary with the road surface as per table, taking the tractive effort of a vehicle on hard level asphalt as unity.

Level asphalt, hard	1.00
Wood pavement	1.15
Level macadam	1.15 to 3
Plank road	.9
Cobble stones	1.75
Good dirt road	1.10 to 2
Ordinary country road, dirt	.2
Sand	.20

Grades—The tractive effort due to grades must be added to the tractive effort for a given road surface. Example: 5 per cent grade on hard level asphalt. Hard level asphalt 25 pounds per ton. 5 per cent grade = 100 pounds per ton, due to grade alone. 100 + 25 = total tractive effort = 125 pounds per ton.

Wind Resistance—Below 12 miles per hour the additional tractive effort necessary to overcome the wind resistance on heavy vehicles is comparatively small. But on the light high-speed vehicles, when running at speeds above 12 miles per hour, the wind resistance becomes quite a large factor.

Economic Speed — Taking everything into consideration, that is to say, life of engine, transmission, tires and maintenance of vehicle as a whole, experience shows that the following table is approximately correct:

Gross weight in pounds.	Type of tires.	Speed in M. P. H.
1,500	Pneumatic	20
2,000	Pneumatic	20
3,000	Pneumatic	18
4,000	Pneumatic	16
2,000	Solid	16
3,000	Solid	15
4,000	Solid	13
5,000	Solid	11
7,000	Solid	9
10,000	Solid	8
15,000	Solid	7
20,000	Solid	6

Stops—The number of stops per mile will have a considerable influence on the energy consumption of a given vehicle.

Acceleration—It should never be too rapid; if it is, there is danger of damaging the engine or snapping a chain or gear. It can be seen from the preceding items that there are a great many factors which influence the energy consumption and, therefore, the performance of a commercial vehicle.

From the Four Winds

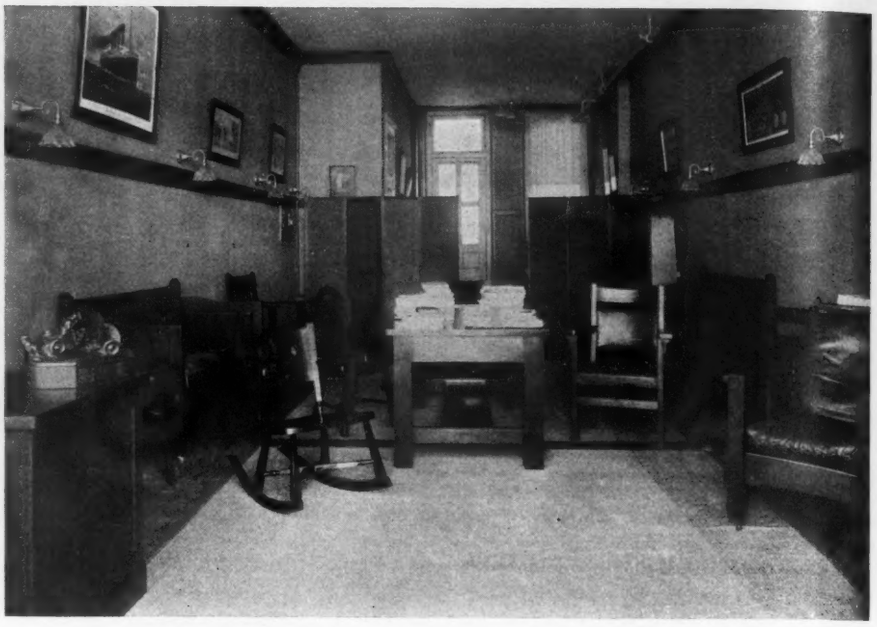
N S E W

Race Winner Going Home—The Ford winner in the ocean-to-ocean race arrived in Kansas City, Mo., Saturday on its way east. The car, driven by B. W. Scott, departed for Minneapolis Monday morning.

Doctors Want Exemption—According to report to Chief of Police Paul Millikin, the speeding of motor cars in Cincinnati has lessened to a great extent. It is stated upon first-class authority that the Society of Physicians will make an effort to secure exemption from the speeding law for its members. The organization may present a plan to the chief of police whereby all machines owned by the medical profession should carry a Red Cross conspicuously displayed some place on their cars and that in cases where haste was demanded they should not be molested by the police.

Will Buy Insurance Patrol—The Milwaukee Board of Fire Underwriters, according to Frank J. Meyer, president, will purchase a motor insurance patrol truck before January 1. The board has only three insurance patrol stations, and it is believed that with a motor truck the territory now practically unprotected can be covered without building a new station. The cities of Beloit and Janesville, Wis., are planning to purchase motor fire steamers, following the example set by Rockford, Ill. The chiefs of these cities, which are close together, believe that with each department so equipped co-operation could be established in a way not possible with horse-drawn engines, and the property owners would benefit in reductions of insurance rates.

Houston to Have a Run—On September 24 some thirty cars will leave Houston for a 5-day endurance run which is being engineered by the Houston Post for dealers and owners in that city. The run will be from Houston to Victoria, 125 miles; Victoria to San Antonio, 130 miles; San Antonio to Austin, 80 miles; Austin to Brenham, 80 miles; Brenham to Houston, 86 miles. Leaving on the 24th the tourists will spend Sunday at San Antonio and on the road to Austin. Letters from towns along the route indicate that the tourists will receive a hearty welcome everywhere. The Post has put up a trophy, a silver cup made in the shape of a lantern, with handles of the horns. Quite a variety of roads will be traversed, the principal kind, however, being good graded dirt roads. Shell, macadam and gravel will be among the other kinds, with here and there a stretch of sand, though happily this will not be frequent. The road was selected with a view to diversity of conditions, and while the major portion of the run is over graded dirt roads, through a prairie country, there will be some hills to climb and descend, none of them quite mountainous, though some are good stiff hills. Olle J. Lorehn is chairman of a committee in whose hands the run rests.



New Quarters of Hartford Automobile Club at Hartford, Conn.

Getting State Rewards—According to figures from Michigan's good roads commissioner's office the northern counties of the lower peninsula are taking more advantage of the state reward good roads law than the southern counties. Some of the northern counties are getting more every year in good road rewards than they pay into the state treasury in taxes.

Jeffery Wins a Legal Battle—Thomas B. Jeffery & Co., of Kenosha, Wis., have won the first round of its fight against the new Wisconsin oil inspection law. The suit brought against the Rambler manufacturers for refusal to pay a tax of 10 cents a gallon for inspecting 72 gallons of gasoline has been dismissed. The oil inspection department will now carry the matter higher. If the law is held to be constitutional, Wisconsin manufacturers, garage keepers and dealers in gasoline will suffer hardships because of the high tax.

Fighting Exorbitant Tolls—The Quakertown and Sellersville Turnpike Co. owns a small piece of pike road in Pennsylvania about 1⅜ miles long, on which it established two of those anachronisms—toll-gates. At each gate the keeper collected 10 cents from each motorist who passed that way—20 cents for the one-way trip. Last Monday the long-suffering motorists had their innings. Gilmore G. Fretz sued the company for charging exorbitant toll and Justice of the Peace Keller, of Perkasie, who decided that under the law the maximum amount that could be charged was 9 cents for the distance, and awarded the plaintiff $5.12, and put the costs on the company.

Zengel Changes Cars—Len Zengel, who drove the big Chadwick to victory at Indianapolis, will return to his old love, the Pennsylvania. He will, however, fill all his race engagements with the Chadwick people till the end of the present season.

Make Overland Journey—Mr. and Mrs. W. G. Selby, of Marietta, O., have arrived at Seattle in their Winton six, having taken 29 days for their overland journey from Pittsburg to the exposition city. On the trip Mr. Selby cleaned one spark plug, otherwise the motor never gave him a moment's thought. From Seattle, Mr. and Mrs. Selby will tour to Los Angeles and thence home via Salt Lake City.

Hartford Club in New Home—The Automobile Club of Hartford is now located in its new home, in the Allyn House annex. The formal opening and housewarming was held last Friday evening. Mayor Hooker, a member of the club, was present. The new quarters have been newly fitted up and there is every facility for making the quarters a comfortable place for the members. The rooms connect with the house cafe, so that the regular hotel service is available at all reasonable hours. The walls are finished in burlap and the furnishings are in mission. The membership of the club is now about 300. The club is well provided with road maps, touring data and the like, and a clerk will be located permanently at the headquar-

ters not only as an assistant to the secretary but also to provide motoring tourists passing through the city with accurate touring directions and information as to condition of roads and the like.

Seattle-Tacoma Boulevard—Pierce county, Washington, recently has asked King county, its neighbor, to unite with it in constructing a boulevard 100 feet wide along the sound front from Seattle to Tacoma. The boulevard is expected to be but the nucleus of a great thoroughfare running along the entire sound front on the American side and connecting with a similar road running out to the straits of San Juan de Fuca to the ocean and down the ocean beach to Gray's Harbor.

Some Motorists Indiscreet—Several complaints have been made of the indiscretion of motorists in the vicinity of Warehouse Point, Conn., by road contractors who are at work rebuilding the road to Springfield, Mass. While at present a detour is necessary over a poor stretch of highway, motorists as a rule insist on passing over the new road, which is not yet in a state to warrant travel of any description. Direct appeals to the motorists themselves have in most instances proved ineffective. The Berlin stretch contractors are up against the same proposition and many drivers will insist on driving over the unfinished road, all of which delays the work of construction.

Tax Collector Inquisitive—The tax collector of Atlantic City accidentally discovered a week ago that owners of motor cars and motor boats who stayed all summer long in their own cottages in the resort invariably failed to include those luxuries in the list of their belongings liable to taxation. When the collector tried to make them pay they called his attention to the fact that they were already taxed for them at their respective winter homes. He evidently does not believe it for he is endeavoring to find out whether or not they pay taxes on their cars and boats at home. Some local owners of motor cars who use them for business purposes are trying to swear off their taxes on the plea that machines used by doctors, builders, etc., are really "tools of their trade," and as such are beyond the control of the tax assessor. The fight put up by all hands has been so determined that the authorities have become alarmed and may call a halt lest some desirable citizens may be driven from the town.

Parade for Kansas City—As a feature of priest of Pallas week, Kansas City's annual festival, the Automobile Club of Kansas City is preparing to give a flower parade. Committees have been appointed to make the arrangements and the plans are taking shape. The festivities are to be held the first week in October.

R. F. D. Using Motor Cars—Several motor cars are to be used in connection with the new R. F. D. route out of Pullman, Wash. The rural route as established leaves Pullman on the Wawawai road and runs to Ontario, thence to the Ryan farm, up Union flat and return to Pullman from the south. The route will be 25 miles in length.

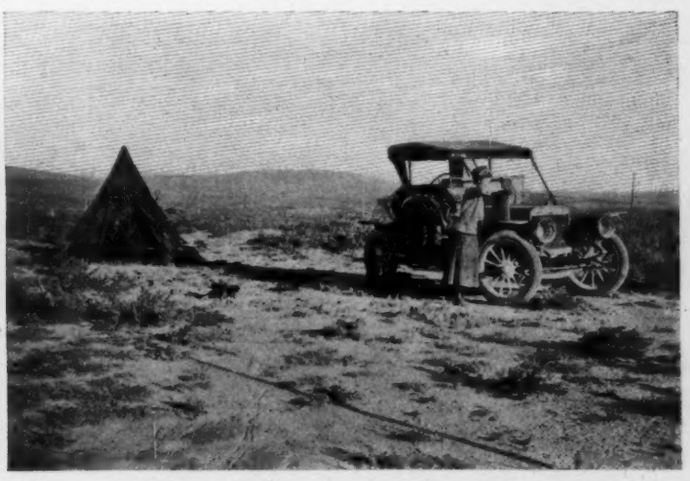
After Joy Riders—Baltimore police authorities and owners of motor vehicles are pushing the crusade against joy riders, with the result that Albert Babb and Joseph Bell, chauffeurs, have been presented by the grand jury on charges of indulging in a joy ride in the motor car of their employer without the owner's knowledge. The result of the ride was that they collided with an ice wagon. The motor car was completely wrecked and one of the wagon horses was killed.

Progressive Denver—A feature of the Denver Motor Club is an information bureau for the benefit of both local and touring motorists which has been established. The conditions of the roads are recorded and printed guides are gladlly supplied to anyone on request. The guide contains maps and gives distances to all points in Colorado as well as grades and quality of the roads. They also contain a list of all owners in the city of Denver and the laws and ordinances of all the principal towns and cities in the state. With this system anyone can tour about the state even though they are not familiar with the roads. In addition to the information bureau the club has a chauffeur's register bureau that members may obtain reliable, competent drivers on short notice. There is also a standing reward of $100 offered to the person causing the arrest and conviction of anyone stealing a member's car.

Seattle Plans Parade—The motor parade which will mark the close of the 4-day's carnival and which is scheduled for September 11, promises to be one of gigantic proportions. Already over fifty machines have entered the four classes, to the winners of which silver cups are to be awarded at the reviewing stand at the exposition.

Skips a Tag Series—Through some misunderstanding the firm that has been supplying the number plates to the Massachusetts highway commission did not send the numbers from 20,900 to 23,000 to the commission and now the registrations are going along from the latter number. Later on there will be other cars registered which will go back to the missing numbers. There have been seven machines owned by foreign diplomats registered this year, and some of the people that have seen the car numbers D3 or D5, etc., have been wondering what sort of registering that was, not knowing the rule relative to diplomats and car registering.

Peerless Trophies Stolen—Manager John L. Snow, of the Boston Peerless branch, opened his store the other morning and he was dismayed to find that a number of the handsome silver trophies won by Peerless cars in many contests in New England, among them the climb up Mount Washington, were gone. Thieves had broken in the rear window and stole the cups. The police were notified and last Friday they arrested Henry J. Sullivan. At his home several of the cups were found, but they had been battered up so that they could be sold for old silver. Three of the trophies were missing, and these were probably sold, as no trace could be found of them. Manager Snow identified the others as the property of the Peerless company. The stolen cups were valued at $1,200. Sullivan was held for the grand jury and he will be brought to trial next month.



SCENES INCIDENT TO TRIP OF MR. AND MRS. SELBY FROM MARIETTA, O., TO SEATTLE IN WINTON SIX

MOTOR CAR SHOP KINKS

GOOD AND BAD SOLDERING JOBS

SOLDER is not held in high esteem for uniting parts subject to stress or vibration, but there are certain parts of a motor car, notably the radiator, the tank and sometimes also the lamps, where it must be used. When, as not seldom happens, the strains of usage prove too much for a soldered joint or seam, it is of considerable importance to know how, if possible, a more permanent job may be done in repairing. There are certain fundamental principles underlying the behavior of solder in all classes of work, and by remembering and applying these correctly solder may often be made to hold in places where hasty or careless workmanship would mean certain failure. These principles may be stated, as follows:

1—The metal surfaces to be joined must be clean.

2—The surfaces must be hot—as hot as the solder itself.

3—The solder must be hot enough to flow with perfect freedom, otherwise it will not enter the pores of the surfaces to be joined.

4—The solder must not be so hot as to burn. A solder bath or a solder iron never should get red hot.

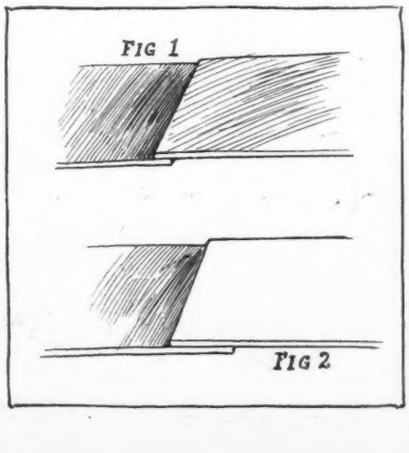
5—The strength of solder is small, and its elastic limit is far below its tensile strength. Crystallization is due to repeated stresses approaching the elastic limit; therefore it follows that to hold permanently or semi-permanently the stresses imposed on the solder per unit area of the joint must be small. In other words, the area of the joint must be large. To illustrate, two strips overlapping by a narrow margin, Fig. 1, have not as good a chance of holding as two strips with a wide overlap, Fig. 2. If the soldered joint is to be as strong as the rest of the piece, evidently the width of the lap must be greater than the thickness of the strips, roughly in proportion as solder is weaker than the material—brass or copper—of the strips. With an overlap sufficiently wide it is quite possible to make a soldered joint stronger than any other part of the piece, but this holds true only if the joint is not subjected to bending or other stresses which localize the strains endured by the solder, instead of permitting them to distribute evenly throughout the joint. If a soldered seam is overstrained it will naturally start to separate first at the edges.

Taking up the foregoing principles in order, their application to sheet metal and small work generally is not difficult. The first requirement, that of cleanliness, should be interpreted in its most rigid sense. Wiping or even cleaning with acid or gasoline is not sufficient. The metal must be chemically clean, and likewise free from any coating of oxide, and the best way to ensure this is to sandpaper or file the surfaces just before soldering. A rough surface is not necessary. It is not difficult to do a good job on thin sheet metal with a soldering iron if the iron is large enough. Time, however, must be allowed for heat to flow from the iron to the work. This process is aided by a liberal supply of solder around the point of the iron. To prevent the solder from running away, the work should be held with the seam horizontal. At best it is impossible to hurry a job of this kind otherwise than by changing irons to keep the work hot. Most of the botches are due either to imperfect cleaning or to the work being hurried through before it is properly heated.

The choice of flux will naturally depend on the work. Resin is suitable for tin, but for brass and copper the flux should be chloride of zinc in saturated solution, or one of the familiar soldering pastes. The object of the flux is to preserve the chemical cleanliness of the metal while it is being heated and before the solder takes hold. Were it not for the flux the hot metal would oxidize slightly on its surface and the solder could not unite with it.

Regarding the proportion of lead and tin in the solder, it is best for good work to have 65 per cent tin and 35 per cent lead by weight. The ordinary plumbers' solder is half and half, but it has not the strength of solder richer in tin, it has been discovered.

When the pieces to be united are of some thickness and bulk, regardless of whether the joint is narrow or wide, a good job cannot be made with a soldering iron, for the simple reason that the parts will absorb heat faster than the iron can supply it, and the joint will be considerably colder than the iron. To do a good job, a torch must be used and the pieces heated thoroughly adjacent to the intended joint, and as far back as may be necessary. This is called sweating. The pieces are usually fastened together beforehand, as in brazing, by pins or wires. The brightened surfaces are fluxed and the torch is applied. When the work is hot the solder is flowed in and allowed to cool slowly.



If the surfaces to be joined are more than ⅛ to ¼ inch wide, as in Fig. 3, it is decidedly better to tin them before uniting. Tinning is simply spreading a smooth coat of solder over the entire surface while hot. Its purpose is to ensure a thorough union, since two such tinned surfaces, if they match each other, only need to be pressed together and heated to the temperature to unite perfectly without additional solder being supplied. If the attempt were made to unite such pieces as shown in Fig. 3 by means of a soldering iron applied at the edges, or even by means of a torch, with untinned surfaces, the inevitable result would be that a bond would be made only at the extreme edges of the joint, and without the torch even this would be doubtful. By tinning the surfaces and supplying enough solder to fill any space due to possible misfit of the surfaces, a perfect union may be made if the work is clean and the temperature correct.

A radiator manufacturer in New York city, whose name is synonymous with careful and thorough workmanship, once told the writer an incident of his early experience in brass work. A certain piece had to be turned in the lathe from a block of brass, which owing to its shape could not be chucked or centered. The relator, who was manager of the shop, was puzzled, and his French foreman excited his incredulity by asserting that the block could be soldered to plate, which could then be bolted to the face plate of the lathe.

"Nonsense!" he exclaimed. "It will drop off as soon as the tool touches it."

Nevertheless the foreman persisted, and was told to go ahead. He gave the work to one of the men in the shop, telling him to solder it on the plate. In due time it came back apparently soldered, and was put in the lathe. As the manager expected, it detached itself from the plate almost at the first touch of the tool.

"Now," said he to the foreman, "what do you say to that?"

But the foreman was not discouraged.

"That man not know how to solder," he responded. Taking the work, he did the soldering job himself, the manager watching him. First, the surfaces were cleaned and fluxed; then they were heated separately under the torch, tinned all over and held at the tinning heat long enough

to allow the solder to soak into the pores of the metal. Then while still hot they were wiped bright and pressed together. Only the thinnest film of solder remained between them, as they matched perfectly, but that film held almost as if it were the metal itself. The work was put in the lathe and the manager started, first cautiously, then with increasingly heavy cuts, and finished in good style with no sign of the bond weakening. To test its strength further, instead of sweating it off, he put it in the vise and used a cold chisel. It took hard hammering and plenty of it to separate the pieces.

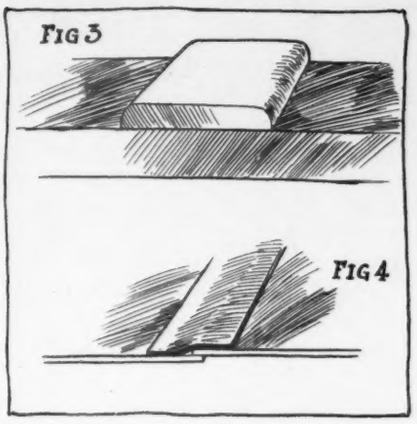
Frequently, especially in manufacturing, much time is saved in sweating operations by dipping the work into a bath of molten solder instead of using a torch. The hot solder supplies the necessary heat to the work, and the whole job is almost instantaneous. Great care is necessary, however, to keep the bath at the proper temperature. If it is too cold the work will not hold. If it is too hot the solder is burned, and that is the end of its usefulness. Evidently the heat needed to be supplied to the bath depends much more on the rate at which heat is abstracted by dipping a succession of cold pieces of metal into the bath, than it does on the mere radiation from the crucible.

In leaving the subject, a suggestion may be made for the practical treatment of radiators which suffer from the common fault of too narrow seams, Fig. 1. The simplest cure will often be found to bend a strip of brass to overlap the seam, and, after drying and soldering the original seam, to solder this strip of brass carefully over it, making sure that its entire undersurface holds, as in Fig. 4.

LOCATING A KNOCK

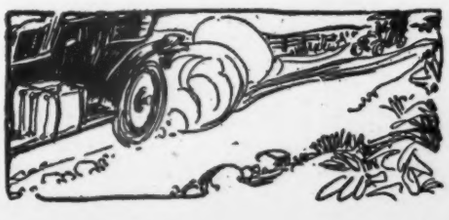
A motor car came from the shop not long ago after the engine had received a thorough overhauling. The crankshaft journals and crankpins had been carefully trued, and white brass bushings had been put in and carefully scraped and fitted. The transmission had been examined and pronounced in sufficiently good order to go through the season. As the car was being taken away, the owner was advised by the shop superintendent to re-time the valves to minimize the clearances between the stems and lifters, as the "boys" in the shop had timed them according to their own notion by marks on the flywheel, with the result of making them noisy without adding to the power.

The engine was certainly noisy, but after reducing the valve clearances the noise was considerably reduced. Before long, however, a distinct knock developed, which worried the owner considerably. It was slight at first, and he did not have time to hunt for it, but after a thousand miles it was too evident to be ignored. The symptoms were peculiar. At first it seemed to stop entirely when the clutch was open, which led to the suspicion that it was not



in the engine at all, but in the clutch or transmission. One day the owner put his ear close to the gear box and heard an unmistakable knock therein, which kept time with the engine, seemingly at half the latter's speed. He still thought he heard a knock in the engine likewise, but was unable to locate it. Subsequent listening for sounds on the road seemed to show that the knock in the gearcase and the knock in the engine were separate and distinct, and that the latter was the more pronounced. Finally the engine knock developed till it became unpleasant when climbing hills, and the owner decided that it was time to do something.

The oilpan was removed, and the shaft tried next to each of the main bearings by putting a jack under it and gently working it up and down. Not the slightest play could be found. Next the cranks were set at half stroke, and the jack was tried against the connecting-rod—again with a negative result. Efforts to trace a shake in the wristpins with the aid of an electric lamp led to no result, and the owner was nearly at the end of his resources. As a final trial, he grasped the No. 3 connectingrod firmly with one hand, and with the fingers of the other on the large end he worked the rod forcibly up and down. To his surprise a distinct shake was felt, although it was deadened somewhat by the oil in the bearing. Evidently the jack had not disclosed it because the piston-ring friction had prevented the rod from coming down after each lift. There were thick brass shims under the large end cap, and apparently the shopman who finished the bearings had failed to seat one of the crankpin bushings snugly in the rod end, or else had been a little careless about getting the shim down to the right thickness, for the surfaces of both crankpin and bushings were perfect. After four or five trials the owner got the shims to a point where the crankshaft turned freely, yet



not the slightest shake could be felt. Then he assembled the rod and tried the others in the same manner. All proved to be snug.

On replacing the dustpan, to his disgust, the knock was apparently as loud as before. It seemed to come from the front end of the engine. A hearing tube failed to locate it, because of the echoes in the tube. Finally a 3-foot stick was obtained and pressed against different parts of the engine in succession, with the owner's chin at the front end. When it was pressed against the inlet valve lift guide of the No. 1 cylinder the knock was found. The top end of the lifter, which was case-hardened, had worn into a depression under the valve-stem, and owing to the slight lateral play of the lifter and stem, the stem would sometimes come central in the depression, and sometimes catch on its edges. In the former case the click was pronounced, in the later case it was not noticeable. In addition, both the end of the valve stem and the base of the depression were slightly beveled. In one position of the valve there was little noise, but when the valve worked itself half way around the knock was distinct.

When the car was tried on the road it was evident that what had before seemed a single knock was in reality a composite of the crankpin knock and the valve knock, for although the valve continued noisy there was no thumping on the hills. In fact, except for the click of that particular valve the engine was almost as quiet as when new. Of course, the valve noise could be temporarily corrected by grinding the valvestem and liftercap square, or by putting in a new liftercap. The owner, however, is thinking of stopping the noise altogether by putting a fiber button on the end of each of the valvestems at the same time that the liftercap is flattened off. To do this he will get a piece of steel tubing $\frac{5}{8}$ inch long, of inside diameter, to fit the valvestem loosely. He will saw a slit in the upper end of the tube and pinch it together to spring over the end of the valvestem, and in the bottom end he will drive a fiber plug $\frac{1}{4}$ inch long, projecting 1-32 inch. The tube will keep the plug from spreading under pressure, and will enable it to be slipped on the valvestem easily after regrinding the valve. As the valve stem ends have "centers" in them, a thin, flat steel button will be interposed between the valvestem and the fiber plug to give a fair bearing over the latter.

And the transmission knock? Apparently there was in reality no transmission knock, for it ceased to be audible after the No. 3 crank bearing was taken up. The conclusion was that what had seemed to be a transmission knock was in reality the engine, whose sound was transmitted through the clutch-shaft to the gear-box, and was heard better in the gearbox than at the engine because near the latter it was drowned by the valve noises.

Among the Makers and Dealers

Opens Chicago Garage—H. C. Smith has opened a garage and machine shop at 2823 Division street, Chicago, located opposite Humboldt park.

Buick Building in Omaha—Another new garage is to be built on the row on Farnam street, Omaha. A two-story brick building will be erected for the Buick company between Nineteenth and Twentieth on Farnam.

Garage for Lancaster—Jeremiah J. Kolaski of Madison, Wis., an engineer employed by the Hokanson Automobile Co., will open a garage, livery and agency at Lancaster, Wis. Repairs will be made a feature.

Organized in Cincinnati—The Evanston Automobile and Garage Co., 3705 Main avenue, Cincinnati, O., has recently been organized by Charles Schiear, C. Roy Clough and F. T. Larson, and has taken the agencies for the Velie and Hupmobile.

Big Demand For Cars—Finch & Freeman, who are agents for the Richmond and Auburn lines at Indianapolis, have closed a contract for the state agency for the Rider-Lewis. For several days the company has not had a car on its floor, illustrating the unusual demand for cars in Indianapolis this season.

Selden in Quakertown—The Selden Car Co., of Pennsylvania, is the latest newcomer in Philadelphia. The salesrooms of the new agency are located at 336-338 North Broad street, and a completely-equipped repair shop is being erected in the rear. L. S. Caswell is president of the new company; W. B. Alley, vice-president, and Fred E. Dyer, treasurer.

Milwaukee in Market—The Milwaukee common council has authorized the purchase of a motor car for the police department. The resolution providing for a car for the board of public works has been referred to the finance committee, but it is expected that there will be no delay. Under a new state law, the board of public works may purchase motor cars for any municipal department without calling for competitive bids.

Continental Changes—O. S. Tweedy, for many years manager of the Chicago branch for the Diamond Rubber Co., and recently connected with the Federal Rubber Co., has been appointed sales manager of the Continental Caoutchouc Co., with home office at 1788-90 Broadway, New York city. R. E. McMasters has been made sales manager for the west and J. H. Sheldon in the east. Several branches have recently been added to this concern and the latest are those located in Boston, 895 Boylston street, with E. H. Kidder as manager, and a Philadelphia branch has been arranged with office at 154 North Broad street, managed by S. S. Poor. C. A. Gilbert, the Chicago manager, is located at 1412-14 Michigan avenue.

New Stearns Addition—The accompanying illustration shows the first of the new additions to the F. B. Stearns factory at Cleveland. This building is practically completed and the machinery is to be installed September 15.

Adds Electric Department—The Hawks Electric Co., of Goshen, Md., has added a department for the care of electric vehicles. The company has taken an agency for the Woods electric and has closed a contract with the Exide Battery Co., of Philadelphia.

Gould With Rainier—George T. Gould, who for the past year has been connected with the Rainier selling force in New York city, has been appointed New England agent for Rainier cars, with headquarters in Boston. He has obtained showroom and garage on Boylston street.

Starts in at Escanaba—The Escanaba Electric and Garage Co. has been organized at Escanaba, Mich., by Frank R. Barkhurst and Matt Flynn, and the business has been established at 619 Ludington street. Mr. Barkhurst recently purchased the business of the Sterling Electric Co.

Cole Company Locates—The Cole Motor Car Co. has taken possession of the large factory building at Washington and Davidson streets in Indianapolis which has been occupied as one of the plants of the Overland Automobile Co. The Overland company is spending $40,000 in new buildings and improvements at its Oliver avenue plant, making the Washington street building no longer necessary. The Cole company will have its painting and trimming departments in a four-story building at New York and Agnes streets.

Has More Room Now—The East End Automobile Co., of Pittsburg, has moved into new quarters on Baum street, near Euclid, where it has double its old space.

Building in South Bend—The Oswald Motor Co., of Goshen, Ind., has commenced the erection of an addition to its factory building, which will enable it to double its output. The addition will be ready for occupancy September 1.

Buzby On a Tour—Harold A. Buzby, secretary and sales manager of the Keystone Lubricating Co., is making a tour of the company's western branches, visiting Chicago, Denver and San Francisco, and taking in the smaller sales offices as well.

First 1910 Rider-Lewis—An accompanying illustration shows the first 1910 Rider-Lewis car which was turned out of the Anderson factory, just 14 days after the installation of the new plant. More machines are being added all the time and within a short time it is hoped to have the new plant running to its full capacity of twenty to thirty cars per day.

Austin Seeks Location—The Austin Automobile Co., of Grand Rapids, Mich., is seeking a new location, which possibly may be Alma, Mich. Officials of the company recently have been in Alma looking over the ground and if satisfactory arrangements can be made it is probable that the plant will be removed. One of the reasons for the removal of the plant is that the company has had a great deal of trouble with the speed laws of Grand Rapids. It is said that the company is pre-

FIRST OF THE RIDER-LEWIS' 1910 OUTPUT

vented from demonstrating its cars satisfactorily because of a too rigid enforcement of the law.

Minneapolis Branch Moves—Morgan & Wright announce that their Minneapolis branch is located in new and more commodious quarters which are situated at 911 First avenue South.

Neilsen Selling Inter-States—V. A. Neilsen, one of the best known drivers in Boston, and formerly with the Rambler agency in the Hub, has joined Virgil A. Charles' forces to handle the Inter-State.

Plans a New Place—The St. Clair Automobile Co., of Greensburg, Pa., has had plans drawn for a garage 46 by 126 feet on North Pennsylvania avenue, in that city. In addition to stabling twenty-five cars, the company will have repair shops.

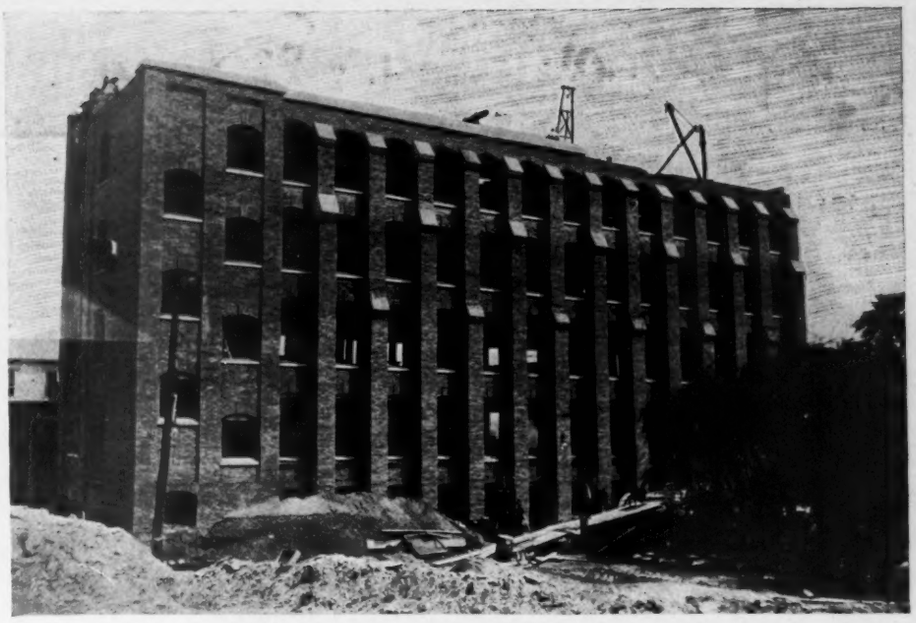
English Expert Secured—William Cheetham, a graduate of the Kensington School of Fine Arts of London, Eng., has taken charge of the construction end of the plant of the Columbia Carriage Co., of Hamilton, O., which manufactures motor car bodies in both wood and aluminum.

Michelin Cramped for Room—The Philadelphia headquarters for Michelin tires, at Broad and Wood streets, has become much too small for the concern's rapidly growing business, and, the lay of the land being such that expansion laterally is impossible, Manager Harry Benner has put men at work constructing a temporary mezzanine pending a decision as to the advisability of removal to larger quarters.

Another Studebaker Building—Within 3 months the Studebaker company will have one of the finest motor car and carriage repositories in Indianapolis. Ground has been broken for the building and the plans, which first called for a four-story building, changed to plans for a six-story structure. The Studebaker company, which will operate in Indianapolis as the Studebaker-Indianapolis Co., will occupy half of the building.

Making Metal Parts—A new company to be known as the Defiance Screw Machine Products Co., has been incorporated at Defiance, O., by William Geiger, Mrs. William Geiger, John Schragg, Mrs. John Schragg and Sidney Thompson. The concern will manufacture motor car metal parts. The building on Perry street adjacent to the Geiger Furniture Co. will be occupied. A new building will also be erected for the use of company.

Coler Maxwell Publicist—Ernest Coler has assumed charge of the Maxwell-Briscoe Motor Co.'s new publishing department. The growing interests of the company have made the creation of the new department desirable. Mr. Coler, who has looked after the Maxwell's publicity for the past 2 years, will continue to publish the Co-Operator and will also be responsible for most Maxwell literature. Berry Rockwell, late of the Railway Steel Springs Co., has accepted the position of advertising manager of the Maxwell-Briscoe Motor Co.



NEW BUILDING ADDED TO THE STEARNS PLANT AT CLEVELAND

Building a New Place—The Rystrom Implement Co., of Stromsburg, Neb., is about to erect a garage 25 by 100 feet, it being the intention of the concern to handle motor cars and accessories.

New Officers Chosen—The new officers of the Pioneer Motor Car Co., of Pittsburg, successor to the Banker Brothers Co., are Charles M. Miller, president; F. T. F. Lovejoy, vice-president; I. Guy Davis, treasurer, and W. J. Lewis, manager.

Locates at Niles—Work has commenced on the foundation for a new garage at Niles, Mich. The building which is being erected by F. J. Plym, will cost $7,000. It will be constructed of brick and steel and equipped with modern facilities. It is located at Second and Cedar streets.

Gets Pierce Agency—The Motor Car Agency of Seattle has been successful in securing western Washington for the Pierce-Arrow, and the firm has taken temporary quarters at 300 Mehlhorn building, pending the completion of a new building at the southeast corner of Broadway and Union streets. The company has incorporated under the Washington laws for $25,000, with Fred Haines as president and manager.

Working on Smith Plant—A. O. Smith, president of the A. O. Smith Co. of Milwaukee, Wis., says that the new $500,000 plant at Keefe avenue, Twenty-seventh and Thirty-second streets, Milwaukee, will be ready for occupancy on October 15. Three railroad spur tracks are being laid to the site, which is approximately 15 acres in extent. Special machinery and equipment now being built for the plant will cost $250,000 and the entire project will reach nearly $1,000,000. One piece of machinery, a press for the manufacture of pressed steel frames, will weigh 185,000 pounds. Construction work has been started.

Branch in Hartford Is Planned—Charles E. Miller, of New York, will open a branch supply house in Hartford, Conn., in the near future.

Change of Name—The name of the Model Automobile Co., of Peru, Ind., has been changed to the Great Western Automobile Co. This does not carry with it any change of ownership or management.

Vicksburg Company Started—The Vicksburg Automobile Co., of Vicksburg, Miss., has been organized with a capital of $10,000, with the following officers: J. H. Hempen, president; F. E. O'Neil, vice-president; A. J. Martin, treasurer; B. J. Reid, general manager; Lee Richardson, secretary.

Lamp People Growing—The Edmonds and Jones Mfg. Co., located in Detroit, Mich., is building a large new factory. The building is to be 215 feet long and is to be built in two wings, 60 and 90 feet wide, and is to be three stories high. With this factory the company will be able to quadruple its present output, which is about 200,000 lamps a year. The floor space will be over 600,000 square feet. In addition to this plant the company is constructing a power plant 40 by 60 feet.

Packard Michigan Corporation—The Packard Motor Car Co. was originally started some 11 years ago as a West Virginia corporation. It became a Michigan corporation September 1. In reorganizing the company under the Michigan laws the capital stock becomes $5,000,000 preferred and $5,000,000 common. The enlargement of the capital stock is made to meet the company's needs for enlargement of floor space and additional facilities generally, in order to enable the company to avoid night work.

Manufacturers' Communications

RECENT MANEUVER EXPERIENCES

HARTFORD, CONN.—Editor Motor Age—The experiences of the Pope-Hartford in the recent war maneuvers at Boston proved the reliability of the car so efficiently that we are enclosing a letter from H. E, Holt, president of the Pope-Hartford Auto Co., of New York, our representative, who writes:

"My Pope-Hartford car was assigned for military service to squadron A, N. G. N. Y., during the recent military maneuvers outside of Boston. We started from Hartford at 5:20 a. m. Saturday morning, August 14, stopping 20 minutes at Springfield for light breakfast and proceeded to Worcester, 88 miles, arriving at the city hall at 10 minutes after 8. We remained in Worcester about 1½ hour for another breakfast, and then proceeded leisurely to New Bedford, stopping on the way at Fall River, where we were delayed for nearly an hour on business. We arrived in New Bedford just as the squadron was starting from the wharf at 1:45. We found the roads in this district to be made up of two kinds—one fair to good macadamized, the other rut roads deep in sand. The ruts having a tread of 60 inches made it extremely difficult to drive through. Saturday afternoon this car was on service steadily until after 8 o clock, traveling almost invariably at the rate of better than 40 miles an hour, making the distance for the day about 237 miles. Sunday morning immediately after reveille at 3 a. m. we covered a distance of 14 miles with the quartermaster in search of milk and eggs. About 6 o'clock camp was broken and the column took up its march through South Middleboro to Rock Station. For 4 hours the column marched at a walk over rut roads through the woods, during which time the car was expected to maintain its position at the rear of the column, which meant traveling on the first gear practically all the time. Arriving in South Middleboro the car was sent forward with the commander of the squadron to find water near which we could make camp. We proceeded about 3 miles up the road and turned off sharp on another sandy road toward Rock Station where we came in touch with the Blues' outpost. It was then 10 minutes to 1 and it was necessary for us to have our advance guard at this point by 1 o'clock. We immediately turned back and plowed through the sand, our rear wheels jumping from one rut to another, our speedometer showing 32 miles until we came in touch with the column.

"We were then sent back again with the commander of the squadron to endeavor to locate the baggage train which had not come up to schedule time. We returned over the route we had taken that morning to our former camp, this time traveling at as rapid a speed as was possible in consideration of the condition of the roads, but seldom going below 30 miles. We found that the wagon train had gone up toward Marion, to which place we followed, and obtained a fresh supply of gasoline. We found there that the baggage train had gone on 4 miles further to obtain hay, and followed it to this town. While endeavoring to get back to South Middleboro by macadamized road we ran into a Blue outpost and were compelled to go back again over the rough rut roads.

"Monday morning we again broke camp at 5 o'clock and the Pope-Hartford was used to visit all the cavalry outposts. These had been sent out at different points like the sticks of a fan, but it was necessary to return to the base each time before visiting another outpost. About 12 o'clock we had once more got into motion, and the Pope-Hartford was again sent out in advance to ascertain if the roads were free of the Blues as far as Middleboro. We found that our outpost had come in contact with the Blues in Middleboro, and were having quite a fight, so we immediately beat it back to the main column, going for the 4 miles better than 45 miles an hour, and were at once ordered back to the advance guards to ascertain how the fight was going on. Here the car was pressed into the service of one of the umpires. He did not seem satisfied with the speed being made, and kept urging me to increase it until finally we had the car traveling over all kinds of roads about 50 miles an hour. Just about this time he discovered the organization he wished to visit at the top of a side hill possibly 50 feet above the road, and instructed me to turn up there. Contrary to his expectation, I turned up there at the rate of speed that we were traveling without slowing down, taking a ditch at the side of the road and crossing a diagonal road on the way up. This effectually silenced the umpire, but he said afterward that next time he wanted to jump ditches and fences he would take a horse. He did not say it in these words, but used a little bit stronger words. We were then sent back to South Middleboro, 7 miles away.

"On Tuesday morning we woke up in a heavy rain storm, and after waiting with the horses all saddled and ready to move out for about 1½ hour, I was once more sent back, about 6:30 a. m., to General Bliss' headquarters for orders. When I returned I found that our organization had gone forward to Middleboro Green, about 3 miles, and was engaged with the advance guards of the Blues. I proceeded with the car to where our led horses were concealed, passing a wagon train of the Tenth cavalry on the way, which compelled me to do most of the distance in the ditch. During the rest of the day in the heavy downpour of rain the car was in active service between the outposts and the main column. Shortly after hostilities ceased I experienced the first, last and only mishap of the trip. I had been trying out some spark plugs of a new make, and these having become thoroughly saturated by the rain, all four went bad at the same time, but upon replacing them with an old set of plugs that I had in my tool kit, all my troubles were ended. The above is a fair sample of the work that the car did on Wednesday and Thursday, finishing up Thursday night with a 10-mile run over to Cohasset on good macadamized or dirt roads, where I obtained for the first time in a week a good bath, in salt water, a good drink and a good dinner. Friday morning after the army broke camp, I started for New York via Providence and New London, averaging all the way to New London about 29 miles an hour. We then went to New York city, making about 256 miles for the day. Yesterday I went out to Short Hills and back to play golf, with the car running as sweetly and quietly as when it came from the factory. While in camp I had three of my mud guards badly twisted through the baggage wagon backing into me when the car was stationary. Twice when I was not with the car and the third time when it was impossible to get out of the way. These I am taking off to get straightened and with the exception of a thorough oiling there is nothing else to be done to the car."—Pope Mfg. Co.

COST OF GUARANTEEING

South Bend, Ind.—Editor Motor Age—What does it cost a manufacturer to guarantee his product for a year? This is a question that has agitated the minds of many manufacturers, and the data that has heretofore been obtainable has been meager. The standard warranty of both national organizations covers only 60 days from date of shipment—and this only for defective workmanship or material. One of the concerns that always has guaranteed its product for a year is the Studebaker Automobile Co. During the time that concern has been marketing Studebaker-Garford cars 1,571 chassis have been sold. Inasmuch as it was the mission of these cars to lay a foundation for the future, the company has been more than liberal in making good its warranty. It comes as a surprise, therefore, to learn that the entire guarantee, counting from March, 1905, to October, 1908, amounted to only $16,620.18—an average of $10.51 per car.—Studebaker Automobile Co.

Brief Business Announcements

Pittsburg, Pa.—Fred W. Fischer has been appointed agent in this city for the Croxton-Keeton Motor Co.

Fairport, L. I.—H. P. Trickley, who has been operating a repair shop here for some time, is transforming his shop into a garage.

Hartford, Conn.—The Pyramid Motor Car Co., of Danbury, has filed a certificate increasing the capital stock of the company from $10,000 to $100,000.

Hartford, Wis.—Work has been started by the Kissel Motor Car Co. on the erection of a new factory 50 by 100 feet and four stories in height. A new warehouse also is in course of construction.

Madison, Wis.—The Superior Motor and Machine Works, of Superior, has been incorporated with a capital stock of $15,000. S. L. Perrin, H. J. O'Brien and M. C. Lavery are named as the incorporators.

Columbus, O.—Articles of incorporation have been filed by the Instantaneous Lighter Co., of this city, which has a capital stock of $30,000, and is to manufacture a lighting apparatus for motor car lamps.

Cleveland, O.—The local headquarters of the Studebaker company are to be enlarged at once, a contract having been let for the addition of a third story. This addition is to be used mainly for the storage of electric machines.

Rock Hill, S. C.—The McFadden Auto Co., which has been located on railroad avenue, has rented the old savings bank building, on Main street, and is to use it as a display and salesroom. It will still continue to occupy its old garage on Railroad avenue.

San Francisco, Cal.—A new building is shortly to be erected at the corner of Van Ness avenue and McAllister street, to be used exclusively by the Consolidated Motor Car Co., the local representative of the Pope-Hartford. The new garage will be ready for occupancy within the next 2 months.

Atlanta, Ga.—A new motor car is now being manufactured at the plant of the Atlanta buggy factory, and is to be known as the White Star Co. The first car was turned out last week and is a four-passenger 30-40-horsepower machine. The company has a capital stock of $150,000, and Clarence Houston is acting as president of the new concern.

Boston, Mass.—Articles of incorporation have been filed by the E. R. Thomas Motor-Branch Co., with a capital stock of $100,000. This concern is designed to look after the interests of the Thomas car in this state, and will have the following officers: President, E. L. Thomas; vice-president, secretary and treasurer, J. M. Edsall; manager, C. S. Henshaw. For the present headquarters will be maintained at 288 Columbus avenue, but work is shortly to be started on the erection of a new building.

Pittsburg, Pa.—In the future the Stevens-Duryea is to be represented in this city by O. E. Vestal. Headquarters have been established at the Rittenhouse, North Highland avenue.

New York—The Velie Motor Vehicle Co., of Moline, Ill., has concluded a contract with George W. Garland, Jr., of this city, to handle its cars throughout New York state, south of Albany, and in the entire State of New Jersey.

Beloit, Wis.—Harry Vale, president of the Vale Garage Co., agent for the Rambler and other lines, and James J. Menhall, of Beloit, are organizing the Beloit Motor Car Co. and will handle the Marion and Overland. The company will have seven counties.

Albany, N. Y.—The Rainier Motor Truck Co., of New York city, has been incorporated with a capital stock of $50,000 to engage in the manufacture of motor trucks for freight only. The incorporators are P. N. Lineberger, G. C. Comstock and J. T. Rainier, all of New York city.

Minneapolis, Minn.—The Michigan Automobile Co., which has been acting as agent for the Knox, has filed articles of incorporation, with a capital stock of $50,000, and in the future is to be known as the Mich-Stair Auto Co. W. A. Stair has joined the concern as a new member of the partnership. A new building is shortly to be erected for the company at First avenue North and Eighth street.

Chicago.—Renault Freres Selling Branch, capital stock $5,000; to deal in motor cars and supplies. Incorporators, William Burry, G. M. Peters, R. D. Richburg.

Covington, Tenn.—Auto Transportation Co., capital stock $3,000. Incorporators, L. Hill, Jr., J. M. Morrison and John Craig.

New York.—Burroughs Remountable Rim Co.; to engage in the manufacture of wheels, tires and rims for motor cars and other vehicles. Incorporators, F. L. C. Keating, John Palmer and Max Rosett.

New York.—Boston Road Realty and Garage Co., capital stock $20,000; to deal in real estate, and is also to manufacture motors, engines and machines. Incorporators, G. H. and Harry Hill and J. B. Kaplan.

Mineola, L. I.—Lincoln Square Garage Co., capital stock $5,000; to manufacture and deal in motor cars, motor cycles and vehicles of all kinds. Incorporators, L. B. Sharpe, J. H. Vernon and J. F. Cronin.

Houston, Tex.—Houston Motor Car Co., capital stock $10.000. Incorporators, E. T. Barden, H. D. Ellis and O. E. Coverdill.

Houston, Tex.—Olds-Oakland Automobile Co., capital $10,000. Incorporators, C. D. Gydeson, Robert Druschke and N. B. Judd.

Staunton, Va.—Beverley Garage, Inc., capital stock $10,000 to $25,000; to engage in a general motor car and garage business. M. W. Mercereau is to be the president and L. A. Beck will act as secretary and treasurer.

Milwaukee, Wis.—Mueller Motor Car Co., capital stock $20,000. Incorporators, H. C. Mueller, C. J. Hirsh and Peter Barth.

New York—The Gross & Gross Co. has leased for Thomas Dimond to the Mutual Taximeter Cab Co. the building at 250 West Eightieth street. This is adjoining the building which was leased by the Franklin Automobile Co. last week through the same brokers.

Springfield, O.—The Commercial Club of this city is endeavoring to induce Captain Philip J. Minch, of Cleveland, to locate his new motor car plant in this city. He was visiting the city recently and seemed favorably impressed with the conditions, so it is likely Springfield will have another plant in the near future.

Hartford, Wis.—O. P. Kissel, of the Kissel Motor Car Co., has purchased the entire season's output of logs from two northern Wisconsin sawmills, approximating 1,000,000 feet of choice lumber, assorted for use for building bodies, interior woodwork for the new Kissel buildings and residences for Kissel workmen at Hartford.

Houston, Tex.—C. F. Gydeson, formerly connected with the Houston Motor Co., is the president of the newly organized Olds-Oakland Co. The company has just filed articles of incorporation, and is to open up headquarters in this city as soon as a suitable location can be found. It is to act as agent throughout the state for both the Oldsmobile and Oakland cars.

Philadelphia, Pa.—A number of improvements have been made to the Regent garage during the summer. In the future there are to be two entrances, one on Baltimore avenue and the other on Springfield, while the storage capacity has been doubled. A new elevator service has been installed, the repair shop has been greatly enlarged, and new equipment has been installed.

Philadelphia, Pa.—Plans have been filed for the erection of a two-story garage to be erected at 115 North Broad street for J. G. Klemm.

Baltimore, Md.—A contract has been signed by the Mar-Del Mobile Co. whereby it is to represent the Franklin during the coming season.

Pittsburg, Pa.—Application is shortly to be made for a charter for a corporation to be known as the Grant Boulevard Petroleum Co. The company is designed to deal in motor car supplies of all kinds.

Lansing, Mich.—The Detroit-Dearborn Motor Car Co., of Dearborn, has been incorporated with a capital stock of $50,000. The Imperial Automobile Co., of Jackson, has filed a certificate increasing its capital stock from $125,000 to $150,000.

Development Briefs

THE PLANARD CARBURETER

A NEW carbureter which has not been marketed up to the present time is the Planhard, made by the Planhard Mfg. Co., Kokomo, Ind. This carbureter, illustrated in Figs. 1 and 2, is conventional in general design and has several characteristic features. Roughly speaking, the vertical section, Fig. 1, shows it is a concentric type of carbureter having the spraying nozzle N located in the center of the ring float F. All of the air enters by the one opening A, that for regular use traveling by way of passages M, past the nozzle N, and that for auxiliary purposes admitted through the ball valve B and passing by way of passages X to above the level of the spraying nozzle. The throttle is a simple butterfly type.

Viewed constructively the carbureter is a simple one, consisting of four castings, designated respectively 1, 2, 3 and 4. No. 1 is the cover; No. 2 is the center or float chamber; No. 3 the middle piece which threads onto No. 1, and so binds parts 1, 2 and 3 together without the necessity of nuts or screws. No. 4 is the air intake which is held in place by a nut Z. To disassemble all that is necessary is to remove the needle valve N and take off the nut Z, when the lower casting 4 can be removed. This done, unthread the part T and the disassembling is completed. All four castings are aluminum and the total carbureter weight is less than 2 pounds.

Not to be overlooked in the air system of this carbureter is the fact that both main and auxiliary air enter by the passage A so that if it is necessary to heat the air the auxiliary is heated at the same time. Equally noticeable is the fact that the main air which enters by passages M, the auxiliary through passages ¼, both pass through restricted strangling tubes at the top of the nozzle. The upper pair of arrows M show how the main air is restricted at the very tip of the nozzle and the arrows ¼ show the passage of the auxiliary air through the restricted opening. The result of this strangling tube effect for both main and auxiliary air is that greater suction is exerted on the gasoline in the nozzle N. This nozzle N is not of the ordinary type, but is closed at its top and has a series of eight horizontal radial holes through its sides near the top and through which the gasoline

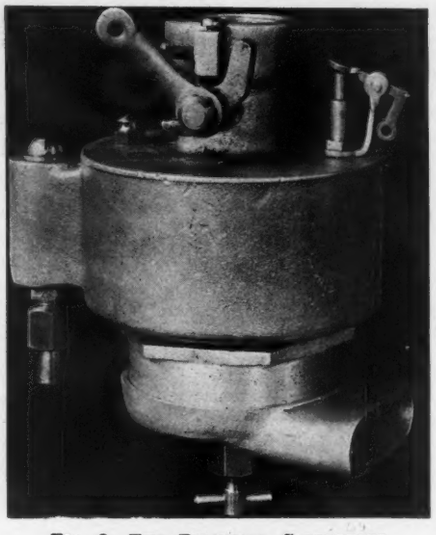


FIG. 2—THE PLANHARD CARBURETER

escapes. A patentable feature in the carbureter is the auxiliary air valves B, which are of the ball type, the balls being lifted from their seatings by the air pressure beneath them when there is a partial vacuum in the passages X. There are six of these balls B, all the same size, made of bronze, and resting on bronze seats. The difference in these valves, however, is in the diameter of the openings P, which they control. All six of these openings are of different size. In the 1-inch carbureter the largest opening is ⅜-inch, and the remaining ones decreased regularly 1/32-inch in diameter. In the 1¼-inch size they vary from ½-inch down by 1/32-inch steps. The object of having the different-sized passages is to get a progression in the lifting of these six valves, so that one will lift first and the others in regular order thereafter. This is accomplished as follows: The ball resting on the largest opening will lift first because there is a greater surface exposed to the atmospheric pressure than with the smaller passages.

The gasoline control system employed in the carbureter is standard. The union G which connects with the gasoline line can be turned to any angle. The needle valve has a hardened cone V, a driving fit on the stem, and the upper end of the stem carries a ball for a ball and socket support on the lever L, which attaches to the float. This lever is fulcrumed on a screw S which can be removed from the outside of the carbureter and with it out the float and needle valve can be withdrawn. The usual priming arrangements Pl are in place.

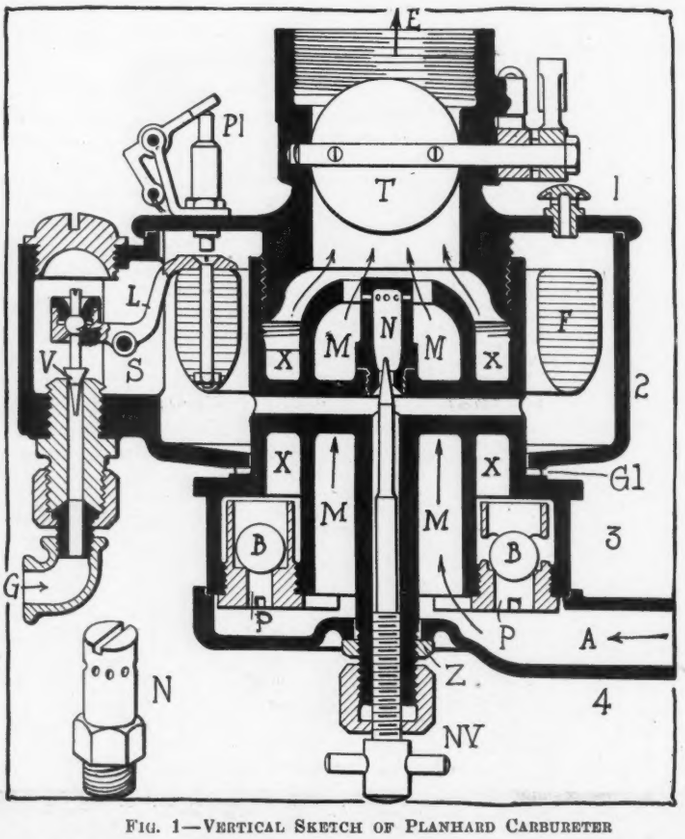


FIG. 1—VERTICAL SKETCH OF PLANHARD CARBURETER

MAKING ACCESSORIES

The General Accumulator and Battery Co., of Milwaukee, Wis., is manufacturing some important accessories to the motor car which contain several novel features. The distinctive feature of the Radium battery is the gauge which shows the available charge at all times. In other respects it is up to the standard with removable covers, patent vents, anti-splashers, and integrally cast posts and connections. The trouble with most storage batteries is caused, it is claimed, by a disposition on the part of the motorist to allow it to become entirely run down before having it recharged. It is to overcome this tendency that this battery is made. The spark-plug produced by this concern is of the porcelain-lined, doubly-insulated type, and is made in three styles to fit any make of motor. All the lower inside walls are lined with fire-proof porcelain, which is designed to prevent the accumulation of carbon deposits. This company also manufactures a decarbonizer which it claims will readily remove carbon deposits from the cylinder and piston heads, piston rings and valve-chambers.